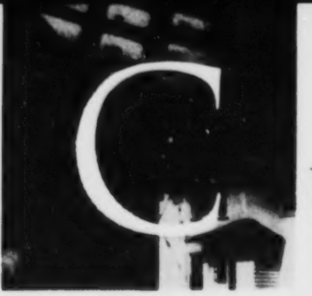

CURRENT HOUSING RESEARCH

Volume 7, No. 2-3

Fall 2000

SOCIAL, ECONOMIC AND TECHNICAL RESEARCH

CMHC SCHL

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Canada

101-01978/

CURRENT HOUSING RESEARCH

Volume 7
Number 2-3
Fall 2000

Issued also in English under the title: *Current Housing Research*

Publié aussi en anglais sous le titre : *Current Housing Research*

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INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "Housing Research Quarterly".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at chic@cmhc-schl.gc.ca

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

CMHC-S EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator
CMHC External Research Program
Research Division
Canada Mortgage and Housing Corporation
700 Montreal Road, Room C7-307
Ottawa, Ontario
K1A 0P7

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TECHNICAL RESEARCH

EVALUATION OF THE HOUSING INTERNSHIP INITIATIVE FOR FIRST NATIONS AND INUIT YOUTH (HIIFNIY)

This report is an evaluation of the Housing Internship Initiative for First Nations and Inuit Youth (HIIFNIY). HIIFNIY is a program funded under the federal government's Youth Employment and Strategy (YES), which is intended to assist young people in making school-to-work transitions. Human Resources Development Canada (HRDC) is the lead agency of the YES program, coordinating its efforts across all federal departments and agencies. Individual departments and agencies in turn implement a variety of related internship and employment programs. The HIIFNIY program, administered through CMHC, is one such program.

The objective of the HIIFNIY program is to aid the transition of Aboriginal and Inuit youth from school to employment and to improve participants' employability through the provision of housing-related work experience and on-the-job training. The program is targeted to Aboriginal youth living in First Nations and Inuit communities. As well as having these labour force objectives, the HIIFNIY also aims to increase the capacity of Aboriginal communities to manage and maintain good housing. The importance of the program was underlined by the conditions of high youth unemployment, and poor housing prominent in Canada's First Nations and Inuit communities.

This evaluation report provides an assessment of the HIIFNIY program as it operated in 1997-98 in all the Provinces and Territories. The purpose of the evaluation was to collect basic data on the operation of the HIIFNIY, and to provide an assessment of the program within Treasury Board guidelines of the Government of Canada.

Prepared by Maang Associates Inc. Ottawa: Audit and Evaluation Services, Canada Mortgage and Housing Corporation, 1999.

NOTE : Aussi disponible en français sous le titre : *Évaluation de l'Initiative de stages en habitation pour les jeunes des Premières nations et les jeunes Inuit* (ISHJPNJI)

STATUS : New Completed Report

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ABORIGINAL HOUSING

INFORMATION TRANSFER OF HEALTHY HOUSING (HH) TECHNOLOGY IN THE ABORIGINAL CONTEXT

This project will convene a symposium of First Nations teams which have, or plan to, undertake Healthy Housing demonstrations to share construction experiences, appropriateness of the technology chosen, and other issues, concerns, best practices etc. To facilitate technology and information transfer broadly to other First Nations communities across Canada, a Best Practices / Lessons Learned (from the demonstrations) information product will be prepared and made available to to illustrate options, solutions and innovations to address some critical health, safety, durability and affordability concerns of on-reserve First Nations housing.

***CMHC Project Officer :** Alain Croteau*

Division : Assisted Housing Division

AVAILABILITY : Publication is not available

***STATUS* :** Ongoing Project

NATIVE TECHNICAL TRAINING - DEVELOPMENT OF TRAINING MODULES

The objective of this project is to provide a set of new and revised technical training materials to facilitate future CMHC and First Nations-sponsored builder training sessions. The preliminary training modules have been successfully piloted in First Nations communities in various parts of Canada. Additional materials related to alternative foundation systems are being finalized.

***CMHC Project Officer :** Alain Croteau*

***CIDN*:** 1750 0300002

Division : Assisted Housing Division

***STATUS* :** Completed

** SEE ALSO: *Indoor Air Quality Training in First Nations Communities*, p. 101

Let's Clear the Air Seminar, p. 103

ACOUSTICS

IMPACT DU BRUIT INDUSTRIEL SUR LES SECTEURS RÉSIDENTIELS ENVIRONNANTS: PORTRAIT DE LA SITUATION POUR LA BEAUCE ET POUR LA RÉGION DE QUÉBEC, ANALYSE DES LOCALISATIONS PROBLÉMATIQUES ET RECOMMANDATIONS

Residential sectors can be adjacent to sectors that are classified as commercial or industrial but, in many cases, the two functions are not compatible, whether on account of intense trucking activity, sporadic noise throughout the day or even continuous noise that can last well into the night. There are many complaints in this regard, in both urban and rural areas. Planners and legislators are generally powerless to resolve this issue. In existing conflict situations, both functions are well within their rights, that is, residents can demand peace and tranquillity, while industrialists can expect to work and operate their companies, without having any new constraints imposed on them. As for potential situations, in the case of new residential developments, for example, there is not always an in-depth environmental analysis, or else, the pressure from developers wins out over the viewpoints of planners and environmentalists.

In this context, the research project proposed to establish the situation regarding the impact of industrial noise using as its laboratory the Québec and Beauce areas, two areas that comprise numerous industrial parks adjacent to residential sectors. The Beauce area, in addition to its very active industries, has a topography that is conducive to the concentration of urbanization and human activities. The principal objectives of the project were as follows:

- establish the scope of the problem of the impact of industrial noise on the closest residential sectors;
- measure and map the noise in the residential sectors deemed the most critical (with special consideration given to industries operating 24 hours a day);
- verify the causes of the situations analyzed (uncontrolled growth of residential developments, poor industrial planning or indifference of the industrial sector);
- identify the provincial and municipal legislative situation;
- analyze the possible mitigating actions (in particular, using computer modelling), such as reducing or controlling the level of noise at the source, or introducing protective measures, which could potentially include landscaping; and, finally,
- compile the results in a regional perspective, for both the survey of the situation and the recommendations.

Among all the industrial zones and parks visited, 15 sites were retained and analyzed in the Beauce area and 27 in the greater Québec area. The research project made it possible to document and clarify an often neglected aspect of residential environment quality and also to propose a few avenues for more sustainable solutions, to the attention of planners, industrialists, municipalities, and even developers.

Prepared by Jean-Gabriel Migneron, Pierre Côté, Wu Weixion. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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RÉDUCTION DU BRUIT PRODUIT PAR LES PORTES DE GARAGES

This study concerns the noise transmitted into multiple housing project living quarters located above the garage entrance at the time of opening and closing the doors installed at this entrance. The report presents the levels of noise transmitted to the living quarters during the operation of the 15 garage doors tested and the installation conditions of each door (wood or concrete construction, mechanically or manually operated door, jamb and mechanism cushioned or not, etc.), as well as ways to reduce the noise transmitted by 7 to 13 dB depending on the installation conditions.

Prepared by Michel Morin, MJB Conseillers en Acoustique inc. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1994 (i.e. 1999) (External Research Program)

STATUS : Completed Report

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SOUND AND FIRE PERFORMANCE OF FIRE STOPS IN MULTI-FAMILY DWELLINGS: FLANKING TRANSMISSION AT JOINTS IN MULTI-FAMILY DWELLINGS: PHASE I: TRANSMISSION VIA FIRE STOPS

Fire stops can introduce a physical connection between the two sides of a double-stud wall, hence providing structural flanking paths for transmission of vibration which worsens the sound insulation.

This study primarily addressed the specific case of a load-bearing party wall with double wood studs, supporting a floor with wood joists perpendicular to the party wall and a floor deck or sub-floor of 15.9 mm OSB.

Even without structural transmission of vibration through a fire stop, the sound insulation in a real building is normally affected by flanking transmission.

Addition of a fire stop provides yet another path for vibration transmission between the rooms, and hence tends to worsen the sound insulation further. This study examines how a fire stop at the floor/wall junction can degrade the apparent sound insulation of the party wall (the nominal separation) by increasing structural transmission of vibration around that wall via the connected floor system (the flanking path).

ACOUSTICS

Prepared by T.R.T. Nightingale, R.E. Halliwell, Institute for Research in Construction, National Research Council. Prepared for: Canada Mortgage and Housing Corporation ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1997.

STATUS : Completed Report

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BASEMENTS, FOUNDATIONS & CRAWLSPACES

BASEMENT WALLS THAT DRY: FINAL PROJECT REPORT

An eighteen month study was undertaken to evaluate the abilities of 10 basement wall insulation/framing options to dry after being subjected to either a controlled leak or a short term flood. Conventional wood framed construction, steel stud construction and three proprietary systems were evaluated. The proprietary systems included a new product from Owens Corning which is a vinyl faced rigid fibreglass system which can be installed without wood or steel framing, an extruded polystyrene insulation system, Perimate from Dow and a sprayed in place polyurethane insulation. Five variations of conventional wood stud framing were evaluated. The differences evaluated ranged from the use of an external moisture barrier to standing the framing off walls and floors to the use of Densglas as an alternative to gypsum board. The two steel stud systems tested varied only in stand off from the basement wall.

In general all of the proprietary wall systems performed better that the wood framed or steel stud systems. The systems either did not absorb significant amounts of moisture or dried relatively rapidly after wetting. This was observed whether the moisture source was a controlled leak or a short term flood.

The steel stud stystems performed better than their wood framed counterparts when subjected to a short term flood. The steel studs, having no capability to retain moisture, dried out more quickly than the wood systems.

Of the wood framed systems tested none appeared superior in both cases; controlled leak or flood. In the case of a controlled leak, such as might occur in the event of a crack in a basement wall, the systems that had an external moisture barrier caused the water to flow down the wall, under the bottom plate and into the basement. Because such system systems were never really wetted they appeared to offer superior performance. When the source of the moisture was a flood the opposite appeared to be true. It was not possible to "seal" the panels, nor was any real attempt made to do so. When standing in 100 mm of water during a "flood" the liquid found its way into all panels, regardless of whether a moisture barrier was present. Once in the panel the moisture remained longer in panels equipped with a moisture barrier. In other words the moisture barrier inhibited moisture removal.

Aside from some darkening in the bottom plate of two of the wood framed panels the study was unsuccessful in producing significant growth of mold or mildew. Conditions were generally favourable; surface moisture and wood moisture contents in excess of 25% for months but no infestations occurred. This may be due to the lack of spores which must be present to initiate growth.

Prepared by Tom W. Forest and Mark Y. Ackerman. Ottawa: Canada Mortgage and Housing Corporation, 1999.

NOTE : Aussi disponible en français sous le titre: *Séchage des murs de sous-sol*

STATUS : Completed Report

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COMPREHENSIVE STUDY ON SLAB-ON-GRADE FOUNDATIONS

The purpose of this project is to investigate and provide answers to technical questions on slab-on-grade insulation, moisture protection, and heating systems appropriate to be used with such a foundation type, and cost effectiveness in various climate regions of Canada. Other aspects to be studied will be: consumer acceptance of this type of "basementless" house; alternate layout designs to accommodate storage; overall pros and cons of the alternative house foundation type.

CMHC Project Officer : *Ken Ruest*

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

Division : Research Division

NEW

BASEMENTS, FOUNDATIONS & CRAWLSPACES

PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS

CMHC is a participant contributing research to this multi-disciplinary, multi-agency study led by the National Research Council identifying knowledge gaps in the performance of basement systems. Guidelines are being developed for design, construction and evaluation of basement materials and systems to ensure their durability and long-term performance. Field work is complete. Guidelines are being drafted. CMHC will look into ways to inform builders and the public about better basement designs.

CMHC Project Officer : *Don Fugler*

CIDN : 1421 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

** SEE ALSO: *The Effectiveness of Various Basement Treatments and Renovations to Solve Identified Basement Moisture Problems*, p. 109

Earthquake Resistant Modular Home Foundation Systems, p. 183

Foundation Systems for Use in Permafrost Areas, p. 114

Innovative Foundations Heating & Ventilation, p. 114

BUILDING CODES

AUSTRALIAN BUILDING REGULATION AND LIABILITY REFORMS

The Commonwealth Government of Australia and individual Australian states have introduced reforms to the regulatory environment in order to reduce costs and barriers associated with development and construction. Some of the reforms include a transition to objective based building codes, the introduction of compulsory job-specific warranty-type insurance programs, limitations on liability for building practitioners, privatization of building approvals and inspections and compulsory registration of building professionals. This project documents the reforms implemented in the State of Victoria based on a review of documentation and regulations and interviews with key actors. The status of similar reforms in other states and territories is reported. The report provides a context for the discussion of the applicability of the Australian building regulation and liability reforms in Canada.

Prepared for Canadian Home Builders' Association and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999. (Healthy Housing and Communities Series Research Report) 37 pages.

Order number: PE0380

NOTE : Aussi disponible en français sous le titre : *Réformes de la réglementation australienne de la construction et des dispositions en matière de responsabilité*

STATUS : New Completed Report

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BUILDING CODES

RECOGNITION OF SECONDARY SUITES IN THE NATIONAL BUILDING CODE

Secondary (or accessory) suites represent an affordable housing option that has received growing attention from provinces and municipalities in recent years. The National Building Code (NBC) currently views them as duplexes or semidetached units. Some Canadian provinces have changed their Building Codes to allow more lenient requirements for secondary suites, particularly in older houses. This study is examining legislation governing secondary suites in several jurisdictions leading to the preparation of a discussion piece on possible changes to the NBC for the recognition of this housing form in the Code.

CMHC Project Officer : *Brian Eames*	***CIDN*** : 2233 0200001
Division : Research Division	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	

ROLE OF CONSTRUCTION CODES IN THE CANADIAN BUILDING SYSTEM

The purpose of this joint venture project with NRC and CHBA is to develop two papers which will help in the understanding of the changes to the Model National Codes which are occurring as a result of efforts currently underway to clarify the objectives of these codes and move them to being Objective-Based. The first paper is entitled "Canada's Construction System and the Context for Model Codes". It presents an overview of the system of construction in Canada and the role of Model Codes in that system. The second paper will describe the value and benefits of Objective-Based Codes to residential builders and renovators. The papers will be published by NRC.

CMHC Project Officer : *Brian Eames*	***CIDN*** : 2248 0200001
Division : Research Division	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	

BUILDING MATERIALS

CHALLENGES AND PROSPECTS FOR THE BUILDING MATERIALS INDUSTRY IN CANADA

This study provides insight into factors that influence Canada's building materials industry and specific sub-industries (gypsum wallboard; plumbing fixtures and fittings; windows and doors; roofing; insulation; heating and air conditioning; exterior cladding; flooring; concrete products; wood products), and the challenges and prospects faced. The findings are based on an extensive consultation process undertaken in 1997 with industry representatives and a review of other information on industry trends and prospects.

Prepared by Greg Lampert, David Redmond, Michael Lio, Linden Holmen, Bob Sheehan. Prepared for Canada Mortgage and Housing Corporation and Canadian Home Builders Association. Ottawa: Canada Mortgage and Housing Corporation, 2000, c1998. (Housing Affordability and Finance Series; Research Report)

Order number: PE0397

NOTE: Aussi disponible en français sous le titre : *Défis et perspectives du secteur canadien des matériaux de construction*

STATUS : New Completed Report

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CONSTRUCTION EN BLOCS DE TERRE COMPRIMÉE

The objectives of this project were to:

1- Assess whether Quebec soils are adequate for compressed earth block construction (CEB);

2- Evaluate the thermal & compression properties of selected earth mixtures from near Montreal; and

3- Simulate CEB wall durability under Quebec winter conditions.

The work undertaken included the following:

1- Soil samples were studied from within a radius of 150 km around Montréal. Thirteen earth samples were brought to the University of Sherbrooke to analyze these soils.

2- Three of these soils were chosen to make compressed earth blocks. With the help of ENTPE (Ecole national de travaux publics de l'Etat, in Lyons, France) five groups of 20 blocks were made from these three soils. Once the curing and drying were completed, these blocks were transported to Concordia University in Montreal for thermal and compression tests.

3- With this data, compressed earth block walls were simulated using the "EMPTIED" software to assess whether these walls would survive harsh winter conditions. Three CEB wall designs were judged to be suitable. (EMPTIED = Envelope Moisture Performance Through Infiltration Exfiltration and Diffusion).

This research will enable architects, contractors and self-builders, to consider the use of this material for construction in northern climates.

Prepared by Ginette Dupuy. CMHC Project Officer: Chris Ives. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

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DURABILITY AND SERVICE LIFE OF MULTI-UNIT RESIDENTIAL BUILDING ELEMENTS AND EQUIPMENT

A Delphi study has been completed to collect information from property managers, property management firms and experts in differing fields to determine, from their experience, the service life of building elements such as HVAC systems, elevators, walls, parking garages, etc. The project report provides service life data on over 200 building elements. Results from the Delphi study are shown in tables that indicate the average service life ranges of various building components and systems. Factors affecting the length of service life are also provided for each element. A procedure for calculating capital replacement cash flows and annual reserve fund contribution is provided with a MS Excel spreadsheet model that can be use for individual building reserve fund calculations.

CMHC Project Officer : *Ken Ruest*

CIDN : 1915 0200002

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

FINAL REPORT FOR ADJUST-A-FORM TESTING

The purpose of this project was to determine the effectiveness of the Adjust-a-Form system for use as a continuous footing. Adjust-a-Form, a reusable adjustable forming system, was originally conceived to improve the line and level of continuous footings, particularly in the residential construction industry. Results of this study demonstrated that Adjust-a-Form improves the line and level of residential footings and saves time and money in the construction. Reluctance within the industry to use this system is attributed to the high initial capital cost, even though it is demonstrated that the amortized cost is lower than for conventional wood forms.

Prepared by Albert Schepers for Tony Azar, Raymax Construction Ltd. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Housing Technology Incentives Program)

STATUS : New Completed Report

AVAILABILITY : Available for loan only from:

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HOW TO READ A MATERIAL SAFETY DATA SHEET (MSDS): ABOUT YOUR HOUSE; CE 18

This fact sheet describes the sections of a typical Material Safety Data Sheet (MSDS) and explains the Workplace Hazardous Materials Information System. The fact sheet gives reasons for wanting to use MSDS's and how to obtain them. Other information sources for chemical ingredients are provided as well as useful web sites.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 4 pages

Note: Aussi disponible en français sous le titre : *Comment déchiffrer une fiche technique sur la sécurité des substances* (FTSS)

STATUS : New Completed Fact Sheet

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MACROECONOMIC IMPACT OF THE BUILDING MATERIALS INDUSTRY IN CANADA

Using input-output (I-O) data and a well-known macroeconomics model of the Canadian economy, this study estimates the economic impact of the Canadian building materials industry in terms of national income and employment for the years 1995 and 1989. The study covers sub-industries producing:

- gypsum, wallboard and accessories;
- plumbing fixtures and fittings;
- windows and doors;
- roofing;
- insulation and air barriers;
- heating and air conditioning systems;
- exterior cladding;
- flooring;
- concrete products;
- ready-to-use lumber;
- paints and related products;
- textile floor coverings;
- kitchen cabinets; and
- floor and wall coverings, excluding vinyl.

For each sub-industry, impacts are broken down into:

- direct impacts, occurring within the sub-industry itself;
- indirect impacts, occurring in industries that supply the sub-industry with raw materials and other inputs; and
- induced impacts, generated throughout the economy as households spend income earned as a result of direct and indirect impacts.

Prepared by Geoff Bromfield, Martha Justus, Keith May, Informetrica Limited. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Housing Affordability and Finance Series: Research Report)

** SEE ALSO: *Update of the Study on Mid-Atlantic Building Materials Market*, p. 198
Study of the Midwest Building Products Market in the Regions of Illinois, Wisconsin and Missouri, p. 196
Potential for Building Products Co-ventures, Exports and Canadian Expertise for Sustainable Housing Development in China, p. 192
Housing Market in the Ukraine and Marketability of Western Canadian Construction Products in the Ukraine, p. 187

Order number: PE0325

Aussi disponible en français sous le titre : *Répercussions macroéconomiques de l'industrie de matériaux de construction au Canada, PF0325.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

PERFORMANCE OF PLASTIC AND COMPOSITE MASONRY TIES

The objective of this project is to investigate the possibility of using alternative materials (plastics or composites) in the fabrication of masonry ties. Detailed research will be undertaken to determine what has been done in the field of masonry ties around the world. The information received will be reviewed with respect to the appropriateness of plastic or composite masonry ties for masonry construction and the opportunities they represent.

CMHC Project Officer : *Luis de Miguel*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200020
STATUS : Ongoing Project

VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS - PHASE II

The Virtual Sample Room (http://www.sampleroom.buygreen.com/) is a web site that provides information on building materials that are environmentally responsible and/or minimize indoor air pollution. The site was developed and continues to be owned by a consortium of federal government departments, municipalities, and CMHC. This project will expand the number of product listings on the Virtual Sample Room web site to approximately 750 and will increase the promotion of the site. This expansion is expected to be complete by January 2001.

CMHC Project Officer : *Darrel Smith*
Division : Research Division

STATUS : Ongoing Project
NEW

AVAILABILITY : Publication will not be published

BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS

In partnership with the Canadian Precast and Prestressed Concrete Institute and Public Works Government Services Canada, this project will develop a practical, advisory document related to pre-cast concrete wall systems in housing applications. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to pre-cast concrete panels, construction details in AutoCAD format, additional sources of information and references. The Guide will help pre-cast manufacturers and installers better explain the capabilities of this wall system to owners and designers and help architects and engineers to produce more reliable construction details. The anticipated release date for the product is March 2001.

CMHC Project Officer : *Luis de Miguel*

CIDN : 2215 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

BEST PRACTICE GUIDE FOR THE EVALUATION, REPAIR AND MAINTENANCE OF PARKING GARAGES

The objective of this project, a partnership between CMHC and PWGSC, is to develop an advisory document providing guidance for the appropriate evaluation, repair, protection, maintenance and monitoring of concrete parking structures.

Billions of dollars are spent annually to repair and maintain concrete structures. Parking garages are subjected to demanding service conditions; not only vehicular loading but also thermal and moisture loads. In addition, the growing trend toward the use of de-icing salts on our roads by municipalities will ensure the need for future concrete repairs and replacement despite a variety of protective measures to delay the deterioration process. Frequent and often unexpected repairs to these structures place enormous financial burdens on the building owners and property managers.

The principle output from this project will be the production of a detailed technical document aimed specifically towards engineers and technologists involved in the evaluation, maintenance and repair of parking structures.

CMHC Project Officer : *Silvio Plescia*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

DEVELOPMENT OF A NEW EDITION OF THE STANDARD FOR CONCRETE CONSTRUCTION FOR HOUSING AND SMALL BUILDINGS (CSA A438)

The purpose of this project was: Ÿ to carry out a review of the literature pertaining to current failures of concrete in residential basements, specifically addressing the high incidence of foundation wall cracking and water penetration.Ÿ to determine how the delivered ready-mix might be improved in crack-resistance and how on-site concreting practices might be remedied; andŸ to bring standard A438 into line with the requirements of the 1994 edition of CSA 23.1 Standard Concrete Materials and Construction.The Canadian Standards Association (CSA), with CMHC and industry support, has redrafted the standard CAN3-A438-M84: Concrete Construction for Housing and Small Buildings. This standard addresses requirements for poured-in-place concrete basements. The new standard is available from CSA.

STATUS : New Completed Report

AVAILABILITY : CSA International
178 Rexdale Boulevard
Etobicoke (Toronto), ON
M9W 1R3
Tel: (416) 747-4000
e-mail: sales@csa-international.org
In U.S. and Canada, call toll free 1-800- 463-6727

INVESTIGATION AND REPAIR STRATEGIES FOR CONCRETE CONSTRUCTION AND CATALOGUE OF INNOVATIVE CONCRETE ASSESSMENT AND REPAIR TECHNOLOGIES

The purpose of this project is to create a survey questionnaire on concrete assessment, repair and monitoring strategies and report on existing protocols regarding concrete problems in multi-unit residential buildings.

CMHC Project Officer : *Silvio Plescia*
CIDN : 1890 0200002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This project will research current assessment, monitoring and repair strategies for concrete repair. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This research will provide consultants, contractors and building owners with available protocols and concrete repair strategies.

CMHC Project Officer : *Silvio Plescia*
CIDN : 1890 0200002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

OVERVIEW OF CONSUMER PROTECTION FOR HOUSING IN CANADA

For most Canadians buying a house is the largest financial expenditure they are ever likely to make. On an ongoing basis, housing represents a major component of household expenditures whether for mortgage or rent payment, maintenance and repairs or renovations and improvements. Canadian consumers have increasingly expressed concerns about dealing with the home building and renovation industry. These concerns have contributed to low consumer confidence in the housing industry, as measured by various public opinion research. Builders and contractors have also expressed concerns regarding issues of liability with respect to housing construction deficiencies and operating problems. New home warranty programs exist to provide some protection for purchasers of new housing but vary in terms of time limits, eligible components and financial limitations. This study will provide an overview of the context and issues surrounding consumer protection for housing in Canada. Information will be collected to produce an inventory of available programs, initiatives and activities addressing consumer protection including warranty programs, inspection services, consumer information products, training activities, etc.

CMHC Project Officer : Brian Eames
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2135 0200001
STATUS : Ongoing Project

PREPARATION OF ABOUT YOUR HOUSE DOCUMENTS

CMHC's About Your House series provides consumers with concise information on a variety of popular housing topics. These information products are available from CMHC's web-site and are designed to be readily photocopied. New topics have recently been added to the several dozen existing ones. The new topics include: How to read an MSDS sheet, Home insulation, Kitchen and bathroom fans, Log houses, Carbon monoxide sensors, and Dehumidifiers.

STATUS : Completed Report
AVAILABILITY : All are available available on CMHC's web-site and at:

CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project will include contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments. Two of the three case studies are complete: a potential soil gas movement problem in a Vancouver high-rise and heavy metals moving from fill in the vicinity of Wells, BC. CMHC is still looking for a third case study site.

CMHC Project Officer : *Don Fugler*

CIDN : 1946 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

DOORS AND WINDOWS

CONCEPTION DE JOINTS DURABLES ENTRE LES FENÊTRES ET LES MURS

This study aimed at finding ways of designing wall/windows joints with increased durability. It took into consideration environmental factors contributing to the deterioration of the joints, different materials incorporated in the window structure, various types of structures, building envelopes, and exterior siding, and different materials which can be used in the joints themselves. The research project included development of construction details, theoretical assessment of the performance of different solution details, definition of test procedures, and laboratory tests on a typical detail. A methodology for designing the joints is included in the report.

Prepared by Air-Ins Inc. and Groupe Petrone. CMHC Project Officer: Jacques Rousseau. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

INFLUENCE DE L'INFILTRATION D'AIR SUR LE RENDEMENT ÉNERGÉTIQUE DES FENÊTRES RÉSIDENTIELLES

There is a Canadian standard to evaluate the energy efficiency of residential windows. This energy efficiency depends on three factors: the thermal resistance of the window; the air infiltration through the frame; and solar gains. This report presents the results of a study aimed at verifying the influence of air filtration.

A new method is proposed to take into account the interaction between the air that comes in and the frame. On the basis of standardized infiltration tests and computerized meteorological files, the real infiltration flows are calculated, taking into account the exterior temperature and the wind speed. As well, the increase in the infiltration flow at low temperatures, caused by the contraction of the frame, is also taken into account. Based on the different infiltration flows calculated, a mathematical model simulating the behaviour of the window is used to quantify the interaction between the air that comes in and the frame.

Two sizes of windows and two types of frames (all PVC aluminum with PVC thermal break) were examined. The results are presented for five Canadian cities: Montreal, Toronto, Winnipeg, Edmonton and Vancouver.

This study revealed that, for the windows examined, the thermal resistance of the frame is greatly affected by air infiltration. In addition, the evaluation of the energy efficiency by the proposed method differs from that calculated using the current Canadian standard. This difference is due to the use of different meteorological files and the fact that the standard does not take into account the interaction between the frame and the air that comes in.

Prepared by Michael Bernier and Stéphane Hallé. CMHC Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH

Access to alternate energy in the North is an important issue identified in a CMHC Client Consultation conducted in 1998. While much literature exists on alternative home energy sources, its presentation is generally inappropriate for northern audiences. Further, much of this information has not been verified for applicability to the North including availability and performance of alternative energy products in the North. This project would create a "decision making tree" through research and compiling information on various forms of alternative energy sources which could be appropriate for the North. It would also identify product gaps. A Best Practices Manual would be produced and pertinent information placed on the NoRTH web site.

CMHC Project Officer : *Aleta Fowler*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS **:** Ongoing Project

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol in December 1997.

CMHC Project Officer : *Duncan Hill*
CIDN : 2249 0200001
Division : Research Division
STATUS **:** Ongoing Project
AVAILABILITY : Publication is not available

ASSESSMENT OF AIR LEAKAGE SPECIFICATIONS AND TEST METHODS FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC will undertake a literature search of published air leakage characteristics of large multi-unit residential and commercial office buildings. Airtightness test methods, quality assurance, installation and performance specifications will also be documented. An assessment of the degree to which the airtightness of large buildings in Canada, both existing and new, could be improved will be performed.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS **:** Planned
NEW

COMMUNITY ENERGY MANAGEMENT - FOUNDATION PAPER

Following the recent Kyoto summit on climate change, the federal government established fifteen "Issue/Sector Tables" to examine the costs and impacts of implementing Canada's greenhouse gas reduction targets. CMHC is a member of the "Municipalities Table" and co-chairs the subcommittee on "Community Energy Planning" (reporting to the Municipalities Table). CMHC recently funded the development of this Foundation Paper on Community Energy Planning.

This paper explores the potential for community energy planning to contribute to the reduction of greenhouse gas emissions in Canada. The discussion begins by defining Community Energy Management (CEM) and its role in achieving larger community goals such as reducing public sector expenditures, job creation and improving the quality of life. This discussion is in the context of the level and pattern of energy use in Canadian communities, particularly the portion that is subject to the influence of CEM initiatives. Two aspects of CEM are examined in some detail: the relationship between land use and energy use, and the potential for district energy systems in Canadian communities.

Prepared by Torrie Smith Associates. Prepared for David D'Amour (CMHC), Co-chairman, Community Energy Planning Subcommittee, Municipalities Table, National Climate Change Process. Ottawa: Canada Mortgage and Housing Corporation, c2000. (Healthy Housing and Communities Series Research Report) v, 33 pages

Order number: PE0354

NOTE : Aussi disponible en français sous le titre : *Gestion communautaire de l'énergie : Document de base.*

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CONSERVATION CO-OPERATIVE CASE STUDIES DOCUMENTATION

The objective of this project is to develop the Conservation Co-operative case study documentation, presentation materials and report using the Green Building computer program.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1817 0300003
STATUS : Ongoing Project

CORRIDOR AIR VENTILATION SYSTEM ENERGY USE IN MULTI-UNIT RESIDENTIAL BUILDINGS

Canada Mortgage and Housing Corporation (CMHC) funded this study to expand knowledge about the energy impact of operating ventilation systems that pressurize corridors in multi-unit residential buildings (MURBs). In the winter of 1997/98, a field test protocol to assess the impact of corridor ventilation system operation was developed and tested on a MURB. Building energy use was monitored with the corridor ventilation system operating one winter night and off the following night. This process was repeated over a range of temperatures. The tests provided real data on the energy impact of operating corridor ventilation systems. Monitoring data were compared with predictions from a computer model. The computer model proved not to be a useful tool for assessing the impacts of corridor ventilation on infiltration or building energy use. In the winter of 1998/99, the field protocol was tested on another four buildings to assess its applicability to buildings with different energy systems.

Data analysis focused on time periods between midnight and early morning, when the impacts of solar gains and day-to-day variation in DHW loads and occupant activities (cooking, cleaning, clothes drying, weekends, holidays, etc.) were assumed to be minimized. Linear regression was applied to each data set (i.e., the fans-on data and the fans-off data) to mathematically define the relationships between outdoor temperature and energy use in each building.

The field protocol was relatively straightforward and inexpensive to apply and could be done without use of expensive or high-tech monitoring equipment. The data analyses, done in a spreadsheet computer program, showed very good correlation between outdoor temperature and whole-building energy use and distinct relationships for the "fan on" and "fan off" operating condition. Observations made on the five study buildings were sufficiently similar to allow for general conclusions to be drawn about the impact of operating corridor ventilation systems on building energy use and whole-building air change rates.

The observed increase in whole building energy use when the corridor ventilation systems were operated in the study buildings ranged from 60 to 90% of energy that would be required to condition the corridor ventilation system air flow. This energy increase was much bigger than expected, based on a fundamental analysis of the buildings. This leads to the conclusion that operating corridor ventilation systems does not appreciably increase indoor-to-outdoor pressure differentials across suite walls so does not displace significant amounts of infiltration.

Turning the corridor ventilation system off did not result in complaints about air quality during cold weather, but did when temperatures were above freezing. As such, turning corridor ventilation systems off may be an effective strategy for reducing energy consumption and peak energy demand during very cold weather.

Prepared by Bert Phillips, Unies Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Duncan Hill. Ottawa: CMHC, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

DOCUMENTATION OF ENERGY EFFICIENCY CASE STUDIES: 1055 BAY STREET, TORONTO

CMHC is in the process of documenting, as case studies, buildings that have been upgraded with respect to energy efficiency. The owners of the high-rise residential building at 1055 Bay Street recently initiated a number of energy efficiency measures that reduced the annual energy consumption of the building. CMHC is conducting a detailed energy audit to assess the cost-benefit of each energy measure implemented in the case study building, both individually and as a complete package. The energy efficiency measures implemented and the energy consumption characteristics of the building before and after the upgrade will be documented as an energy efficiency case study.

CMHC Project Officer : *Duncan Hill*
CIDN : 1899 0200005
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing.

CMHC Project Officer : *Duncan Hill*
CIDN : 1899 0200002-3
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

ENERGY EFFICIENCY CASE STUDIES: MONITORING A DUEL HEATING SYSTEM INSTALLATION

This research will monitor and assess the performance of a dual fuel heating system in an 89 suite apartment building. Originally, the building was heated with electric baseboards. The presence of natural gas fired boilers allowed the installation of hydronic radiant panel within apartments to shift the heating load from electricity to natural gas. Following the installation of the system, the energy consumption of the building was tracked for a one-year period. A report will be issued that describes the system and its potential to reduce energy costs.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project

ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), is in the process of developing a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document will be based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual will offer proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A web-based version of the manual is being developed that will be installed on the CMHC web-site. The production of the web-based version has also allowed for a simultaneous final editing of the manual in preparation for publication.

CMHC Project Officer : *Duncan Hill*
CIDN : 1887 0200002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

EVALUATION OF EMBODIED ENERGY FOR THE CONSERVATION CO-OPERATIVE

The objective of this project is to complete the evaluation of embodied energy for the Conservation Co-operative case study documentation.

CMHC Project Officer : *Sandra Marshall*
CIDN : 1817 0300002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

FINANCIAL TOOLS FOR CO2 REDUCTION

This project responds to Canada's planned Kyoto commitment to take actions that will help reduce CO2 emissions. It aims to identify financial mechanisms that can encourage and accelerate the adoption of energy efficiency measures for existing and new housing. It will survey financial mechanisms that have been used in Canada and abroad and evaluate their potential for take up and energy use reduction. It will examine in more depth six initiatives and draw from them lessons that would apply to Canada's conditions. It will subsequently examine a number of initiatives for potential implementation in cooperation with Canadian financial institutions.

CMHC Project Officer : *Fanis Grammenos*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

NEW

IMPACT OF ADDED INSULATION ON AIR LEAKAGE PATTERNS

The objectives of this project were: 1. To test a method of characterizing air exfiltration, experimentally and analytically. 2. To determine the impact of two insulation strategies - from inside and from outside - on the dispersal of exfiltrating air through various types of joints.

Adding insulation to exterior walls may worsen the original wall performance. Depending on the amount and geometry of air leakage in the original wall, added insulation may actually increase the potential for condensation, letting water accumulate in the wood structure and leading to rot.

An experiment was set up to compare the performance of different leaky walls and to investigate their behaviour with insulation added on one side or other of the wood studs. The experiment also maps the path of air leakage. The test conditions represented winter and late spring weather in Montreal.

It was found that the first measure to be considered remains the sealing and air tightening of the existing walls, with special care given to junctions and to punctures. If not sealed, leaky walls were found to accumulate moisture, especially when insulated on the outside.

Research Team: Dominique Derome, Paul Fazio, Guylaine Desmarais. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2000 (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

INTERNATIONAL ENERGY AGENCY (IEA) : ENERGY RELATED ENVIRONMENTAL IMPACT OF BUILDINGS

This four year project, scheduled to end in 2000, is an IEA activity in which 14 countries are collaborating in the development of life-cycle energy modelling and environmental impact analysis for buildings. Information will be compiled and published on the methodology and life-cycle environmental impact data. Examples will be developed of how methods may be applied to different building types and sources of expertise, with the potential for extending the influence of the task directly into academia. CMHC is acting as the Operating Agency for this project.

CMHC Project Officer : *Thomas Green*
CIDN : 1629 0300006
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

LABORATORY TESTING OF DENSE PACK CELLULOSE FOR ATTIC INSULATION

Some insulators claim that dense packing of cellulose insulation into hard to reach cavities (e.g. flat roof attics) prevents air movement along with providing insulation. Hydro Québec looked at the technique for upgrading attic insulation of flat roof housing, largely in Montreal. CMHC and the Société d'habitation du Québec (SHQ) also contributed funds to this project. The field work is complete. CMHC is discussing with Hydro Québec ways of publishing the report or a condensation of its findings.

CMHC Project Officer : *Don Fugler*
CIDN : 1377 02010001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

** SEE ALSO: *Re-insulation of Existing Flat-Roof Multi-family Buildings in Québec*, p. 111

MÉTHODE D'ESTIMATION ÉNERGÉTIQUE DES BÂTIMENTS D'HABITATION BASÉE SUR L'APPLICATION DE L'INTELLIGENCE ARTIFICIELLE

The objective of this project was to develop a rapid method of estimating energy use in highrise residential buildings, by the application of artificial intelligence. The method gives a variety of results, such as total energy consumption, power load, heat and cooling consumption, and takes into consideration such variables as apartment orientation, occupancy schedules, and the interaction of HVAC and envelope systems.

The work consisted of:

- Creation of data bases which classify the parameters of the energy simulations, modeling and validation of the results using DOE-2;
- Application of neural networks including training and validation of the results;
- Development of the simulation for residential buildings; and
- Validation of the simulation program.

The program at this stage has been developed for climatic conditions similar to Ottawa, which will be expanded at a later stage. It was tested to verify its accuracy using a previously monitored Ottawa highrise. It provides the total building energy consumption as well as the use by apartments, corridors and parking, with the power loads. The data entry and results interfaces can be modified as well. The program was developed using the MatLab environment: for a larger application, the program would need to be translated into C++ language.

Prepared by Stanislaw Kajl and Marc-Antoine Roberge. CMHC Project Manager: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road,
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
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NEEDS ASSESSMENT FOR A CANADIAN HOUSING RETROFIT CONFERENCE

A project to undertake a cursory review of housing retrofit activity in Canada, the existence of housing-related retrofit programs being offered and the perceived need to share information on housing retrofit and renovation strategies has been completed. The project focused on energy efficiency-related renovation and upgrade activities as these efforts can cause more problems than they solve if they are not done properly. Utilities, housing providers, government agencies (outside the federal government) and renovators were consulted to determine what energy efficiency upgrade programs are underway in Canada, what the level of renovation activities are, the problems associated with energy efficiency upgrades and the need for a national or regional forum on energy efficient upgrade measures, new technologies, precautionary practices, program design and delivery, energy ratings, etc. The survey, though limited, found that available retrofit programs tend to be very local. The only notable exception is Natural Resource Canada's ENERGUIDE for Houses program. It also confirmed that the retrofit industry is aware of the health and durability issues of housing renovation and energy efficiency upgrades. The idea of a housing retrofit conference to discuss these issues was highly supported although it was difficult to estimate the overall strength of support that would be available from the renovation and housing industries in the absence of widespread energy efficiency or house renovation upgrade programs (such as the weatherization programs that historically provided both the audience and expertise for the Affordable Comfort Conference in the United States). A conference format was preferred with interactive workshops that deal with technologies and housing systems rather than specific project types. Cost, venues and duration are also documented in the report. Based on the findings of the survey, CMHC will initiate discussions with other leading government agencies to determine whether or not to support the development of a housing retrofit conference.

CMHC Project Officer : *Duncan Hill*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2131 0200002

STATUS : Ongoing Project

PHASE II: ADVANCED TECHNOLOGY DATA BROWSER

CMHC, together with Natural Resources Canada and Public Works and Government Services Canada, has developed an advanced building technologies web site (www.advancedbuildings.org). The web site will be used to profile innovative design and construction technologies, supporting case studies and research. It is envisioned that the web site will later be supported and managed by a building industry stakeholder group made up of private sector, utility and public sector agencies. The web site provides information on technologies that can increase building durability, affordability and occupant health and comfort while reducing resource use and environmental impact. An emphasis will be placed on "Made in Canada" products and services in support of housing export opportunities. The web site is now fully operational.

STATUS : Completed

AVAILABILITY : On the Internet, see above.

RENTAL STOCK ENVELOPE SURVEY

The STAR Database, used for modeling Canadian housing performance, requires data from a representative number of rental houses. This project looked at rental housing stock to see how it differs from owner-occupied stock and examined how rental stock could be suitably sampled for inclusion in the STAR Database. The findings show that rental stock does differ significantly from owner-occupied stock and that STAR needs to be upgraded if it is to represent rental stock. The contractor estimated that data on an additional 175 to 200 houses would be required. Currently ten additional rental houses are being tested in conjunction with NRCan.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1766 0200002
STATUS : Ongoing Project

SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA

This project involves the collection of the physical and operational characteristics of 40 multi-unit residential buildings from all regions in Canada. Energy and water consumption histories for the past 2 to 3 years have also been collected for each building. The survey portion of this work is now complete. CMHC is in the process of developing a database to store the building files and to allow for the comparison of energy and water usage given building age, size, region, fuel type and occupancy. The building files will also be used in combination with an energy simulator-green house gas estimator to estimate the impact of upgrading the stock of multi-unit residential buildings in Canada. It is envisioned that the database will be supplemented with additional buildings that CMHC will access in the course of other research projects.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2249 0200002
STATUS : Ongoing Project
NEW

UPDATING THE AIRTIGHTNESS TESTING STANDARD

The airtightness testing standard, Canadian General Standards Board (CGSB) 149.10, was published in 1986 and requires updating and simplification. CMHC engaged a contractor to undertake this work in 1998/99. The new draft standard was balloted in the winter of 2000. Reviews and comments are currently being evaluated.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1971 0200001
STATUS : Ongoing Project

VENTILATION IN 2 OR 3 UNIT MULTI-FAMILY BUILDINGS BEFORE AND AFTER WEATHERIZATION

Older multifamily buildings offer a great opportunity for energy savings because they are poorly insulated and are not airtight. These buildings often have no mechanical ventilation system and rely on the air leakage through the exterior envelope to provide an adequate supply of outdoor air. Sealing measures can greatly reduce the equivalent leakage area of the exterior shell and change the location of the neutral pressure plane. This has a major impact on the outdoor air supply and how it is distributed on a unit-per-unit basis.

This study investigates the outdoor air supply of a 2-unit multifamily building before and after weatherization and evaluates the effectiveness of exhaust only ventilation in weatherized buildings. Air flow was simulated with CONTAM, a software developed by the National Institute of Standards and Technology (NIST) and the case study building is typical of the buildings targeted by recent weatherization programs performed in Quebec.

The results show that outdoor air supply due to infiltration depends on the location of the unit and its degree of connectivity with the adjacent unit. For buildings whose units are relatively well connected to each other, the results show that the fresh air change rate of the top unit due to infiltration is negligible prior to weatherization and that weatherization of the roof space significantly reduces inter-zonal leakage. The results also showed that exhaust fans are ineffective in increasing outdoor air supply to the top unit of such buildings. Possible solutions include the installation of a balanced mechanical ventilation system or performing sealing works to increase the airtightness between the units. For buildings whose units are relatively isolated from one another, the results showed that exhaust-only ventilation is an effective means of providing outdoor air, especially during mild outdoor temperatures.

The findings presented herein contribute to our knowledge of ventilation issues with respect to a segment of the existing building stock which is most likely to be targeted for energy retrofits and weatherization programs in the near future. The results also shed light on the effectiveness of exhaust only ventilation as a means to increase fresh air supply to occupants.

Determining the ventilation needs of multifamily buildings, regardless of weatherization, is a complex task. Within the scope of a weatherization program, it is important to establish an airtightness testing method which quantifies both the shell and inter-zonal leakage and to adopt a computer program which can simulate the fresh air distribution for a given design day or hourly weather profile.

Prepared by Dino Gerbasi, Sircont. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
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CLEANING UP YOUR HOUSE AFTER A FIRE

After a Fire is a consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies. It is planned for publication by the end of 2000.

CMHC Project Officer : *Ken Ruest*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2298 0200001

STATUS : Ongoing Project

COSTS AND BENEFITS TO MUNICIPALITIES OF MANDATORY RESIDENTIAL FIRE SPRINKLERS: SUMMARY REPORT

This report presents the results of a study to assess, from an economic perspective, the costs and benefits to municipalities of the mandatory installation of fire sprinklers in all new residential construction. The study was commissioned by Canada Mortgage and Housing Corporation (CMHC), with the participation of the Ontario Ministry of Municipal Affairs and Housing, and the Office of the Ontario Fire Marshal. The National Research Council and Federation of Canadian Municipalities were also involved in the project. In Phase 1, the economic model was developed and tested using data collected from two Ontario case study municipalities, Barrie and Burlington. Subsequently, in Phase 2, revisions to the method and economic model were made and four additional case studies were carried out. The Phase 2 case study municipalities were Edmonton, Alberta; Pitt Meadows, British Columbia; Gatineau, Quebec; and Kawacatoose First Nation, Saskatchewan.

The study examines the benefits and costs of automatic sprinklers and estimates the effect of mandatory sprinklers on the cost of providing municipal fire protection services. The study also identifies the impact of sprinklers on the cost of housing development, construction and maintenance. Municipal costs, such as potential changes in municipal infrastructure, municipal insurance premiums and fire department facilities and operations, have been considered. Development costs, such as the direct provision of infrastructure or the payment of development charges, are examined. Direct construction costs, such as the installation of the sprinkler system, and ongoing operating and maintenance costs for the homeowner, are also identified.

Prepared by: Arencon Inc. with the assistance of Clayton Research Associates Limited, Graham Harmsworth Lai & Associates Ltd., and J.G. Henderson & Associates. CMHC Project Managers: Tom Kerwin, Mark Holzman, Nicole Parent. Ottawa: Canada Mortgage and Housing Corporation, 1999, c1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0314

Aussi disponible en français sous le titre : ***L'installation obligatoire d'extincteurs automatiques à eau dans les habitations coûts et avantages pour les municipalités.***

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

FIRE RESISTANCE TESTS ON FULL-SCALE FLOOR ASSEMBLIES

This report presents the results of 32 standard fire resistance tests conducted on full-scale floor assemblies as part of the collaborative industry-government research program investigating the effects on the fire resistance of lightweight floor assemblies of subfloor material, gypsum board screw spacing from board edges, wood-I-joist type, method of fastening the gypsum board butt ends, insulation type, number of gypsum board layers, joist spacing, resilient channel spacing, addition of concrete topping, steel/concrete composite systems and structural load.

Prepared by: M.A. Sultan, Y.P. Seguin, P. Leroux, Institute for Research in Construction, National Research Council. Prepared for Boise Cascade Corporation, Canada Mortgage and Housing Corporation, Canadian Home Builders' Association ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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IMPACT ON LIFE RISK OF MANDATORY SPRINKLERS IN RESIDENTIAL BUILDINS

The fire risk assessment model, developed by the National Research Council of Canada (NRC), was used to assess whether an apartment building with sprinkler protection but with increased fire department response time provides a level of fire safety for the occupants equivalent to that in a building without sprinkler protection but with the current fire department response time. The NRC model is called FIRECAM™ (Fire Risk Evaluation and Cost Assessment Model). The model assesses the expected risk to life and the fire costs in a building based on the dynamic interaction of fire and smoke spread, occupant evacuation and fire department response.

In this study, a 3-storey apartment building is used as a representative building in a new development area of a municipality, where buildings may range from a single family house to a medium-rise apartment building. The expected risk to life to the occupants is assessed with and without added sprinkler protection and with two levels of fire department response: with and without new fire stations.

New development areas in five cities are used in this study. They are Barrie and Burlington in Ontario; Pitt Meadows, B.C.; Edmonton, Alberta; and Gatineau, Quebec. In each municipality, the response times of the fire department are calculated using existing fire stations and added new stations. Future stations were previously determined by the municipal fire departments to meet protection needs for projected populations. In addition, the impact of mandatory sprinklers in an existing First Nations Community, Kawacatoose in Saskatchewan, is also assessed.

The results of this study show that, using a 3-storey apartment building as a model building, the provision of sprinkler protection and a longer than normal fire department response time (i.e. no new fire stations) provides a level of fire safety better than the case without sprinkler protection but with a normal fire department response time (i.e. with new fire stations). Based on similarity considerations in fire and smoke spread and occupant evacuation between single family houses and apartment buildings, the impacts of mandatory sprinklers on the expected risk to life, obtained for 3-storey apartment buildings, are argued to be applicable to single family houses.

Prepared by D. Yung, G.V. Hadjisophocleous, N. Benichou and Q. Liu. Prepared for Canada Mortgage and Housing Corporation. Ottawa: Institute for Research in Construction, National Research Council Canada, 1999.

STATUS : Completed Report

AVAILABILITY : Institute for Research in Construction
National Research Council Canada
1500 Montreal Road
Ottawa, Ontario
K1A 0R6

INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings will be evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. If successful, PPV may offer Fire Departments an effective, lower cost, life and property saving tool.

CMHC Project Officer : *Duncan Hill*

CIDN : 1983 0200002

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

LEARN NOT TO BURN CURRICULUM FOR ABORIGINAL COMMUNITIES

The purpose of this project is to modify the Learn Not to Burn curriculum, successfully developed and used by the U.S. National Fire Protection Agency (NFPA), for usage in Canadian First Nations communities for grades K - 2. The Aboriginal curriculum has been developed by the Assembly of First Nations, with the assistance of the NFPA, the Aboriginal Firefighters' Association of Canada (AFFAC). It has been pilot tested in several First Nations classrooms and is now available and being delivered across the country under the direction of AFFAC.

CMHC Project Officer : *Alain Croteau*

CIDN : 1719 0300001

Division : Assisted Housing

STATUS : Completed

AVAILABILITY : Publication will not be published

SOUND AND FIRE PERFORMANCE OF FIRE STOPS IN MULTI-FAMILY DWELLINGS: FIRE SPREAD IN WALL-FLOOR JOINTS OF MULTI-FAMILY DWELLINGS

This report presents the results of 3 full-scale tests conducted at the Institute for Research in Construction, National Research Council of Canada on double stud party wall/floor joints. The assemblies were tested in a floor furnace using the CAN/ULC-S101-M89 temperature-time relationship. This study was part of a joint research project on the fire and sound flanking at the wall/floor joints in double stud wall assemblies.

Assemblies No. 1 and No. 2 were tested with various fire stop materials: semi-rigid glass and rock fibre insulation boards, sheet steel and Oriented Strand Board (OSB) placed between the joist headers, to investigate whether these materials will prevent flame spread into the upper storey cavity between studs for 15 min. Assembly No. 3 was tested, with no fire stop material in the space between the joist headers, to investigate the effect of the width of the vertical air space (12.7 mm, 25.4 mm and 38.1mm) between insulated double-stud frames on flame spread to the upper storey cavity between studs.

Prepared by: M.A. Sultan, Y.P. Seguin, p. Leroux, Institute for Research in Construction, National Research Council. Prepared for Canada Mortgage and Housing Corporation ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1997.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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** SEE ALSO: *Safety in Cases of Fire - Persons with Reduced Mobility Living in Regular Residential Environments*, p. 236

JULY 1996 SAGUENAY DISASTER: IMPACTS ON REDEFINING THE HABITAT

The intent of this research is to allow one to appreciate, based on a target population in the Saguenay region, the consequences of a natural disaster in the design of one's home and the role this plays in the various stages disaster victims go through when they are required to relocate involuntarily. In more specific terms, this research attempts to answer the following questions:

- What were the residential itineraries of families which were uprooted against their will as a result of the floods of July 1996?
- What modifications did those who were involuntarily located make to their homes?
- What mechanisms did these people resort to in order to integrate into their new communities?
- What decision-making strategies could be used to take into account the needs and the living experience of relocated persons?

The research strategy takes a qualitative approach which involves interviews with about forty persons or couples who lost their homes and all their personal possessions during the floods of July 1996. Two verification instruments are used to explain what has been observed - semi-directed interviews and fact sheets. The answers to the questions asked produced the following findings. In addition to the physical and psychological effects of the direct consequences of the disaster and the numerous related difficulties, several aspects of the victims' personal, family, professional and social lives changed - (a) residential itineraries (most victims relocated three or four times before taking up their current residence) were a source of major tension; (b) integration into new neighbourhoods was mainly achieved with the participation of family and friends, and the new neighbours were often left out of the process. According to the disaster victims, living in a new neighbourhood means a break or even mourning, e.g. "A separation from friends, the loss of a feeling of security, changes in lifestyle, financial constraints, etc.; (c) the loss of "this paradise (...) this great corner of the world" elicits a new definition of the housing which is marked by images or representations that are negative (feeling of strangeness, nostalgia, indebtedness, sentimental losses, etc.); (d) finally, disaster victims have some suggestions to pass on to others who suffer a similar fate to inform and guide them. They suggest that victims take a step back before they make any important decisions. If volunteers are required at all times to display an understanding and generous attitude, the various levels of government should reduce bureaucratic and administrative requirements. Another suggestion offered by disaster victims was to extend the period during which financial and psychological help would be provided.

Prepared by Danielle Maltais, Suzie Robichaud. CMHC Project Officer: Marcel Boily. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

NOTE : Aussi disponible en français sous le titre : *Le sinistre de juillet 1996 au Saguenay : conséquences sur la redéfinition de l'habitat*

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will determine the ventilation requirements for apartments. Equipment and systems will be evaluated in their ability to meet such requirements in the context of building design, occupancy type and recent experiences in the application of ventilation systems in multi-unit residential buildings. Design and installation recommendations will be created for use by building designers. Technology gaps (e.g.; the absence of appropriate equipment) will also be identified for the benefit of future research and development efforts.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Planned

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings.

CMHC Project Officer : *Duncan Hill*
CIDN : 1934 0200005
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

COMPARISON OF CENTRAL AND ENSUITE SPACE / DOMESTIC HOT WATER HEATING SYSTEMS FOR MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will assess the relative costs and fuel usage of central and ensuite space and domestic hot water ensuite systems. This work will determine whether or not there are differences in fuel systems in multi-unit residential buildings. Fuel billing histories of multi-unit residential buildings will be reviewed to identify the annual operating costs and fuel used by multi-unit buildings that have either central space and hot water heating systems or usage and operating costs in buildings of similar size, occupancy, age and location. This information will be useful to property owners, managers and developers when they are in the process of deciding whether or not to invest in central or ensuite systems for their buildings.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Planned

CORROSION OF DOMESTIC OIL TANKS

The objective of this External Research project was to investigate the corrosion of domestic oil tanks. Based on the findings, a number of predictive/preventative maintenance techniques as well as changes to tank fabrication were explored.

The project found:

- There is no significant difference in the composition or properties of the steel used today than what was used more than 30 years ago. Tank sludge is relatively, chemically neutral and the results of the micro biological testing do not support bacteria as the cause of corrosion.

- The primary cause of accelerated corrosion based on the findings of this research appears to be chloride-laden water. Water and chloride can gain entry into a domestic oil tank through a number of means, e.g., atmospheric moist air and salt-water fog, water leaks, sea water contamination.

- Using non-corrosive materials, e.g. stainless steel, fiberglass, bladders, to manufacture oil tanks is one way to prevent internal corrosion. A more economical approach would be to remove the corroding medium, i.e., water. Domestic oil tanks can be checked for water accumulation quite easily by using a water indicating paste. This process could be included as part of an oil burner technician's annual inspection.

Prepared by William Moody. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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DAWSON CITY DEMONSTRATION PROJECT - MONITORING

The objective of this project is to evaluate the state of the mechanical and monitoring system, conduct an on-site inspection in Dawson City and develop a proposal for monitoring and analysing the system's performance.

CMHC Project Officer : *Mark Holzman*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1676 0300005
STATUS : Ongoing Project

EVALUATION OF RESIDENTIAL FURNACE FILTERS

Forced air furnaces are a common Canadian heating system. Traditionally, filters placed in the circulating air ductwork were designed to protect the furnace and fans. Over the last several years, there has been increased emphasis on improving the filtration efficiency with the goal of reducing occupant exposure to respirable particulate.

This project tested the performance of different filters in actual houses, from disposable fiberglass to electrostatic precipitators. The contractor looked at how air filtration affects the levels of particulates (airborne dust) in housing, and at the production of ozone by electrostatic precipitators.

Analysis shows that good filters do remove particulates at rates that are close to their rated performance. For example, the most effective filter tested, an electrostatic precipitator, reduced the quantity of particulate in the air in the duct from 70% - 90 % in different tests. But, because particulate is constantly infiltrating the house and is being created by occupant activities, the tests showed that when this very good filter was in operation, the concentration of airborne particulate in the house air was reduced only 40%. All other filters tested, being less efficient, fell in the range of less than 40% reduction. As well, these filters only work when the furnace fan is on. If the fan is not run continuously, installing good filtration will be even less effective.

A more comprehensive dust-reduction program is necessary (e.g. reducing house air leakage, better and more frequent vacuuming, reducing house particulate sources, etc.) to make a significant reduction in house airborne particulate, rather than simply increasing furnace filter efficiency. Upgrading filters is only a partial solution.

Prepared by Dara Bowser, Bowser Technical Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. CMHC, 1999. (Housing Technology Series)

Order number: PE0343

NOTE : Aussi disponible en français sous le titre : *Évaluation des filtres pour générateurs d'air chaud résidentiels.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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EVALUATION OF RESIDENTIAL IN-DUCT AIR FILTERS

There are many residential air filters that have appeared in the last several years, providing an abundance of choice for consumers. Unfortunately, consumers have little objective information on the relative performance of these filters. This project is testing the performance of different filters, from disposable fiberglass to electrostatic precipitators, in houses. The contractor has looked at how air filtration affects the levels of particulates (dust) in housing, and at the production of ozone by electrostatic precipitators. Testing is complete in the six sample houses and a report has been published. Fifteen houses with existing electrostatic precipitators have been sampled for indoor ozone concentrations in late Fall of 1998. Analysis shows that good filters do remove particulates at rates that are close to their rated performance. However, the use of a good filter will not necessarily render house air pristine due to large particulate sources both inside and outside the house. An "About Your House" draft has been issued on these initial findings plus the research report and conference papers. A second phase of the research is starting that will look at issues such as ozone, particulate migration through the building envelope, and dust resuspension on hard vs. carpeted floors.

CMHC Project Officer : *Don Fugler*

STATUS : Ongoing Project

Division : Research Division

FIELD SURVEY OF HEAT RECOVERY VENTILATION SYSTEMS

Ventilation is one of the most important design issues of the 90's in the Canadian construction industry. Building codes promote the comfort and safety of occupants by ensuring fresh air is provided to new homes, and stale, contaminated air is exhausted outdoors. Increasingly, these code requirements are being satisfied by the use of packaged heat recovery ventilators (HRVs).

Given the increased reliance on HRVs for ventilation, several authorities expressed a desire to explore and assess the relationships between home design, mechanical ventilation system design, installation practices and occupant use of ventilation systems as they relate to the effectiveness of ventilation of the dwelling. In response to such concerns, Canada Mortgage and Housing Corporation engaged Buchan, Lawton, Parent Ltd to study the field performance of HRV ventilation systems.

The conclusions drawn from these results will make it possible to improve installation practices, HRV system performance, and occupant understanding of and interaction with their HRV system.

The project involved four phases: 1) inspections of 60 homes with HRV ventilation systems, 2) survey of the occupants of the 60 households to determine their understanding and usage of their HRV ventilation systems and a telephone survey of a further 15 households, 3) intensive performance testing of existing HRV ventilation systems, and 4) intensive performance testing of experimental HRV ventilation systems.

The methodology for Phases III and IV involved the use of a trace concentration of gas to assess air change rates. Sulphur Hexafluoride, an innocuous gas not found in household environments, was released at predetermined points throughout the house and mixed by mechanical means until similar concentrations were achieved throughout the house. By measuring the decay in the concentration of the gas, the apparent air change rates were derived. The operating conditions of the ventilation system and the locations of the sampling points had an impact on the extent to which the measurements reflected whole house ventilation rates, room-by-room ventilation rates, natural air change rates caused by forces other than mechanical ventilation systems, or other factors related to ventilation, such as short circuiting within rooms, and cross contamination.

The common types of HRV installations investigated under this study (fully ducted, simplified and extended) were capable of performing well. The majority of the HRV ventilation systems were operating and were perceived to be providing a benefit to the occupants of the houses. Far greater benefits were possible, however, and considerable improvements could be made in installation practice, system performance, occupant understanding and occupant interaction with their system.

Prepared by Buchan, Lawton, Parent Ltd (Toronto & Ottawa) and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
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FIELD TESTS OF VENTILATION SYSTEMS INSTALLED TO MEET THE 1993 OBC AND 1995 NBC

This study concerns new houses designed and built to provincial or municipal codes that require the 1995 National Building Code (NBC). Ventilation requirements in recent Canadian building codes have become more complex and problematic to builders. The ventilation design needs to balance fresh air and exhausting air, and to consider house depressurization factors. The research team performed air testing on forty-one new houses in the western provinces, the North, and the Maritimes to verify their compliance with code required ventilation. Eleven houses were tested in Ontario, where the building code differs slightly from 1995 NBC. No houses complied with all appropriate codes and standards; many had dangerous levels of house depressurization. The contractor tested potentially compliant systems in three houses in Manitoba in December 1999 and January 2000. These three installed systems were close to compliance, but were not perfect.

The study identified some deficiencies with NBC Section 9.32 requirements, particularly regarding protection from depressurization for chimney-vented combustion appliances. The study concludes that builders and installers need to improve their knowledge of the NBC residential ventilation requirements, that NBC Section 9.32 is in need of some changes and that stricter enforcement of the residential requirements is needed.

The research findings have been disseminated throughout the builder, code official, and research communities to solicit solutions. A Task Group under National Research Council has come forward with changes to Section 9.32 of the NBC. These proposed clauses will be tested in sample houses, and must prove themselves practical and effective, prior to being brought forward as proposed changes to the NBC.

Prepared by Bert Phillips, Unies Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation and the NRC Canadian Commission on Building and Fire Codes. CMHC Project Officer: Don Fugler. Ottawa: CMHC, 2000.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
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IDENTIFYING AND REMOVING POLLUTANTS FROM HEAT RECOVERY VENTILATORS

This study investigated the presence of allergens such as dust and molds in heat recovery ventilation systems and the duct work. It also looked at two different types of cleaning equipment and their ability to clean these pollutants from the rigid and flexible ductwork and heat recovery ventilator (HRV) cores in dedicated balanced supply and exhaust ventilation systems. Samples from the ductwork and cores of ten ventilation systems were tested for levels of dust and mold. The ductwork and cores were then cleaned using standard ductwork cleaning apparatus, then tested again to indicate the success of the cleaning process. All houses were tested for air and surface mold counts using an RCS air sampler and typical swab collection systems. Two of the ten houses were re-tested over a period of fifteen months. There were high mold counts on the surfaces of the supply air ducts. However, there was no correlation to house air mold counts, which were found to be inconclusive. It could not be determined whether airborne molds were considered a health risk in the houses as tested. It was also found that conventional equipment was not effective in cleaning the ductwork systems.

Prepared by Terry Watters, Sustainable Housing and Education Consultants Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
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IMPORTANCE OF BATHROOM AND KITCHEN FANS. ABOUT YOUR HOUSE; CE17

This 4 page fact sheet outlines the importance of bathroom and kitchen fans in a home's ventilation system. It describes common fan and exhaust systems and how to choose the best system. Topics covered include: what to look for in bathroom fans, kitchen range hoods, noise and cleaning considerations, weather hoods, grills and backdraft dampers, and installation, fire and safety concerns.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 4 pages

NOTE : Aussi disponible en français sous le titre : *Importance des ventilateurs de cuisine et de salle de bains*

STATUS : New Completed Fact Sheet

AVAILABILITY :Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
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Tel.: 613-748-2367 or 1-800-668-2642
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MECHANICAL VENTILATION OF HOUSES

CMHC participates on the National Building Code's Standing Committee Task Group on Review of Mechanical Ventilation Requirements on Houses. The Corporation is contributing to a Task Group project to redraft the ventilation sections of the National Building Code. This draft has been delivered to the Task Group and is being reviewed by the members.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1584 0200002
STATUS : Ongoing Project

MONITORING A DUEL HEATING SYSTEM INSTALLATION

This research will monitor and assess the performance of a dual fuel heating system in an 89 suite apartment building.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1899 0200004
STATUS : Ongoing Project

PART-LOAD AND FROSTING CONTROL FOR ROTARY ENERGY WHEELS USED IN RESIDENTIAL BUILDINGS

The objective of this research is to determine the performance of rotary energy wheels, also called enthalpy wheels, for ventilation air exchange in residential buildings while subjected to a wide range of operating conditions.

CMHC Project Officer : *Duncan Hill*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2007 0200001
STATUS : Ongoing Project

RETROFITTING VENTILATION

This project is to examine how effectively ventilation can be retrofitted to existing houses, either as a standalone project or as part of a larger renovation. The research team has tested the effectiveness of retrofitted ventilation systems in older homes and their effects on indoor air quality. The individual house reports will describe practical methods for installing ventilation equipment and ducting in older homes. The field work is complete; reports are being prepared.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2063 0200001
STATUS : Ongoing Project

TO ASSESS THE PERFORMANCE OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM.

The Lebreton Flats district heating system, installed 20 years ago, is one of few examples of low temperature district heating systems in North America. The availability of fuel consumption and maintenance records for the system allows for an assessment of the performance of the system over the last 20 year period. It will also allow for a comparison of the district system with more conventional heating system options. Monitoring will be undertaken to assess the performance of the plant. Recommendations regarding system performance, potential upgrades and future operation, maintenance needs and other ownership/management arrangements will be made.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2134 0200001
STATUS : Ongoing Project

ASSESSMENT REPAIR STRATEGY FOR EXISTING BUILDINGS CONSTRUCTED WITH MASONRY VENEER STEEL STUD WALLS

Canada Mortgage and Housing Corporation (CMHC) retained T.W.J. Trestain Structural Engineering to undertake a review of assessment and repair techniques for problem masonry veneer steel stud (MV/SS) walls. This document is intended to define state-of-the-art "good practice", a needed reference point upon which evaluations of deficiencies, renovation strategies and construction methods can be based.

Two competing approaches to field investigation are discussed - the medical model versus the technical audit model. Neither approach is sufficient on its own and a blended model is therefore proposed. Methods of gathering field information are discussed including a proposed systematic approach to the review of problem MV/SS walls. The successful diagnosis(es) of problem MV/SS walls requires an understanding of the basic engineering and building science issues. Accordingly, typical MV/SS deficiencies and the consequences associated with those deficiencies are presented.

In order to assist the investigator to answer the question "Is it good enough?", a number of analysis tools are proposed along with some suggested decision making criteria. The analysis tools include reduced Limit States Design load factors, conventional analysis, finite element analysis and full-scale field testing. The basic analysis routine for the finite element program was developed as part of another CMHC project and then customized with a number of features specifically for this project. Lastly, a compendium of possible maintain or restore strategies is presented for problem MV/SS walls. Included is a section on economic analysis which provides guidance on the optimum course of action that best meets the needs of public safety, building performance and the financial position of the building owners.

Prepared by T. W.J. Trestain. Prepared for Technical Policy and Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1996.

NOTE : Aussi disponible en français sous le titre : *Stratégies d'évaluation et de remise en état des bâtiments existants à ossature en acier et à parement en maçonnerie.*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

BC MOISTURE PROBLEMS - ENVELOPE DRYING RATES EXPERIMENT

Findings from the 'Survey of Building Envelope Failures in the Coastal Climate of British Columbia' revealed that the construction of walls with face seal or concealed barrier systems does not promote rapid drying of wall assemblies once the moisture has saturated the moisture barrier and passed into the sheathing. The solution to promote drying of the wall assembly has been to introduce an air cavity behind the claddings. The objective of this project is to identify, through laboratory work, a range of cavity and vent configurations which will provide wall drying capability characteristics necessary to deal with the coastal British Columbia climate. In addition to the vents, the effect of insulation, vapour barrier, type of building paper and type of cladding will be investigated.

CMHC Project Officer : *Mark Salerno, Silvio Plescia* ***CIDN*** : 1816 0300009

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

BC MOISTURE PROBLEMS - QUALITY ASSURANCE PROTOCOL "TEST DRIVE"

The objective of this study was to produce a protocol which will form the baseline quality management system for the exterior envelope of 3 and 4 storey wood frame construction in British Columbia. The protocol deals with the conclusion and recommendations identified in the "Survey of Building Envelope Failure in the Coastal Climate of British Columbia". The protocol will also tie into the "Best Practice Guide for Wood Frame Construction in the Coastal Climate of British Columbia". The protocol has been reviewed and is being tested in a real project in order to refine it.

CMHC Project Officer : *Mark Salerno, Jacques Rousseau* ***CIDN*** : 1816 0300006

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. Construction details for fire and sound assemblies will be detailed. The document is being produced in collaboration with the NRC/IRC.

CMHC Project Officer : *Ken Ruest* ***CIDN*** : 1804 0300003

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS)

A Best Practice Guide governing the design and installation of EIFS systems will be developed. The guide will be intended for designers and will provide guidance for common details in the building envelope design , as they relate to EIF systems. The project is funded in partnership with the EIFS Council of Canada and the BC Wall and Ceiling Association.

CMHC Project Officer : *Luis de Miguel*
CIDN : 2047 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY

In recent years, there have been significant efforts to understand and resolve moisture ingress and deterioration problems associated with wood-framed, low-rise building construction. Currently, this problem is acute in some wood-frame condominium in the Lower Mainland of British Columbia. There are indications that the high-rise stock may also be experiencing similar moisture problems. The objective of this project is to examine the files of a sample of approximately forty buildings to assess whether the high-rise stock in the coastal climate of lower mainland BC is experiencing significant moisture related problems. The project will not estimate the extent of a potential problem. The project will focus specifically on envelope details and envelope systems that have failed, rather than building failures. Envelope types and components under review will include window/wall assemblies and light-gauge steel stud (back-up) wall assemblies with stucco, masonry and EIFS cladding systems. The work is scheduled for completion in the summer of 2000.

CMHC Project Officer : *Mark Salerno, Silvio Plescia*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project

CASE STUDIES FOR INNOVATIVE TECHNOLOGY AND SOLUTIONS IN SUCCESSFUL MULTI-FAMILY HOUSING

Successful innovative Canadian multi-family residential buildings are being identified and documented for future monitoring. Areas such as durable building envelope, energy savings, life-cycle costs and environmentally responsive solutions will be evaluated. One multi-family residential building, the Conservation Co-operative, was selected for evaluation and was presented at the Green Building Challenge in Vancouver in the Fall of 1998. Posters of several Canadian residential projects were prepared for the October GBC conference. The selected systems are the subject of illustrated case stories which also are available on the Research website www.cmhc-schl.gc.ca/research/highrise under the title Building Innovation.

CMHC Project Officer : *Sandra Marshall*
CIDN : 1817 0300001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project will review Statscan data files to estimate the number of condominiums in Canada, their location, age, number of stories and number of suites. This information will be used to supplement the CMHC Rental Market Survey in order to estimate the overall population of multi-unit residential buildings in Canada. This information will also be used to determine the data requirements for a database of multi-unit buildings that describes the physical characteristics and energy consumption patterns of this class of buildings. Such a database is necessary to establish energy retrofit guidelines for multi-unit residential buildings. The project will be completed by November, 2000.

CMHC Project Officer : *Duncan Hill*	**Division :** Research Division
AVAILABILITY : Publication is not available	***STATUS :*** Ongoing Project

COMPARATIVE ANALYSIS OF RESIDENTIAL CONSTRUCTION IN SEATTLE, WA AND VANCOUVER, B.C.

The purpose of this study was to compare wood frame residential buildings located in Vancouver B.C. and Seattle, WA and identify potential causal factors of building envelope problems. The comparative analysis will highlight any differences in construction materials, methods or codes/regulations which dictate specific techniques or building characteristics. The basic objective was to pinpoint any obvious differences that can be concluded as avoiding the typical causal factors leading to building envelope failure.

Four buildings were studied and compared; two «problem» buildings (one in each of Vancouver and Seattle) which had experienced problems, and two «control» buildings which had not experienced problems. The building attributes used as selection criteria for the sampling were: three to four storey wood-frame, stucco clad, built in last ten years as market (Strata or Condominium title) residential buildings.

The results of the study found some legislative (insurance) and contracting (bonding) differences, have created a more heavily regulated building industry in Seattle. This, allied with the slower economic activity in Seattle, may be a factor in improving the quality of residential construction, but there are as yet no available statistics (a current survey anticipates results in April 1999), which can provide comparable data of envelope performance problems or percentage of incidence to number of residential units.

The comparison of construction materials and envelope assemblies found some differences in sheathing material (gypsum board) and variability in the application of a vapour retarder. However, these differences did not appear to be significant in creating different causal factors leading to moisture related building envelope failures. The problem buildings in fact exhibited the same problematic features with respect to water management principles and failed to effectively balance moisture ingress, drainage and drying mechanisms. The prime failure mechanism in both locales is water bypassing the weather barrier and lack of protection of the sheathing from wetting (from an exterior source not interior moisture source).

The conclusions from the study indicate that face sealed design strategies are very sensitive to climatic/exposure and construction variables and therefore the reliance on concealed barrier systems is unlikely to achieve acceptable performance. Rainscreen wall assemblies offer the best opportunity to achieve acceptable performance.

Ottawa: Canada Mortgage and Housing Corporation, BERC, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CONDITION SURVEY OF CONDOMINUMS

This project will survey the condition of condominiums in Ontario and Québec. The first phase will document the physical conditions and related financial, governance and social particulars in the selected buildings in the Greater Toronto Area.

CMHC Project Officer : *Sandra Marshall*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

NEW

CONDITION SURVEY OF HIGH-RISE RENTAL STOCK IN THE CITY OF TORONTO

This study was completed in two phases and provided two deliverables expected to be useful for future building evaluation and repair assessment. Phase I was the development of a survey instrument suitable for the assessment of high-rise rental housing condition and costs for repair. Phase II was the actual survey of buildings and the analysis of the findings.

The objective of the Phase II survey of buildings was to determine actual on site data on a statistically relevant sampling of buildings. A unique form of survey was needed to permit a relatively large sampling of buildings at a reasonably low cost per building. The survey protocol developed in Phase I allows easy recording of the data by suitably skilled people. The database structure employed to analyze the data is based on Microsoft Access and can be refined as needed to permit specific assessments.

The primary output is a survey of 63 high-rise buildings, in the Cities of Toronto and York, providing comprehensive building condition and repair data. The survey results are available for analysis; however, the actual building addresses and ownership was maintained in confidence. The results of the study are presented in this report. A separate database is provided, including the building data, but excluding address and ownership details.

The study was initiated out of a need to better understand the condition of the high-rise rental housing stock and thus, to be able to better come to grips with the needs of the buildings in order to sustain the stock into the future. While it is known that the majority of the existing high-rise rental stock in the Toronto area is in the order of 30 years old, reliable information on building condition, costs and repair needs are not well documented in a readily retrievable form. The study structure thus developed to meet the following goals:

- to sample the buildings in Central Toronto and determine costs for repair and condition of the buildings on the basis of a more reasonable cross-section of the building population.
- to improve on the cost and condition information by providing 1) condition and cost data on a large sample of buildings; 2) costs over a ten year period; and 3) a range and frequency distribution of costs for buildings, different building systems and different repair periods in the future.
- to provide data on the condition of buildings that will facilitate the direction of research appropriate to building repair strategies.

Prepared by Gerald R. Genge Building Consultants Inc. Prepared for Canada Mortgage and Housing Corporation, the City of Toronto and the City of York. CMHC Project Officer: Sandra Marshall. Sutton West, ON: Gerald R. Genge, 1998. 2 volumes.

STATUS : Completed Report

AVAILABILITY : Available only on a loan basis from:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca

CONTRIBUTION TO THE PREPARATION OF AN ANALYSIS OF OPERATING AND MAINTENANCE COSTS STUDY

The objective of this project was to obtain up to date and regional financial information on operating and maintenance costs for approximately 100 multiple housing projects, using year end financial statements.

CMHC Project Officer : *Sandra Marshall*

CIDN : 1561 0300003

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE

The project will survey design and construction professionals and property managers of existing converted buildings across Canada to determine the extent and nature of technical problems which were encountered in the design and construction phases of the conversions; to determine the perception of property managers of the comfort and concerns of the occupants; to determine the technical problems which have arisen as a result of these conversions; to determine if there were any attempts to improve energy use performance or to introduce features to improve the sustainability of these buildings. Selected building would be documented as case studies in CMHC's Better Buildings/Innovative Buildings information series. The research report on this study is expected to be completed by the end of 2000.

CMHC Project Officer : *Sandra Marshall*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

DRYING OF WALLS WITH VENTILATED STUCCO CLADDING: A PARAMETRIC ANALYSIS

A parametric study of stucco clad wall systems was undertaken to help understand the drying behaviour of outer wall venting systems and to determine which systems would be worth investigating in an experimental test program be the Envelope Drying Rates Analysis Consortium (EDRA). In the course of the investigation, additional questions arose about how the study would be conducted, and simulations were provided to help guide the test program.

The main objective was to study ventilation cavity parameters for stucco wall systems using WALLDRY, a computer program developed by Canada Mortgage and Housing Corporation (CMHC). A significant number of combinations of ventilation cavity depths and vent gap heights were included to assist the EDRA steering committee to decide on the final parameters for the experimental work. This report details the findings for steady-state laboratory conditions with different thermal and relative humidity (RH) conditions.

Prepared by Donald M. Onysko, DMO Associates. Ottawa: Canada Mortgage and Housing Corporation, c2000. (Housing Technology Series; Research Report) xi, 62 pages.

Order number: PE0375

NOTE : Aussi disponible en français sous le titre : *Analyse paramétrique de l'assèchement des murs revêtus de stucco ventilé.*

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

ENVIRONMENTAL ASSESSMENT TOOL FOR MULTIFAMILY BUILDINGS: PHASE III FINAL REPORT: ENVIRONMENTAL ASSESSMENT OF FOUR BUILDINGS

This is a report on the third phase of an assessment of existing environmental assessment methods with the intent of identifying the basis for a comprehensive multifamily residential assessment tool.

CMHC wishes to identify the requirements of a comprehensive tool to assess energy and resource use, durability, environmental impact, indoor air quality and a host of other areas in multifamily residential buildings. The assessment tool is needed to:

- evaluate sustainable building projects;- raise industry and consumer awareness of sustainable building issues;- assess compliance with future sustainable building regulations;- assess the impact of energy retrofits on existing buildings.

Most of the tools in use were developed for commercial offices and may not adequately assess multifamily buildings. CMHC wished to identify elements of the existing commercial tools adaptable to multifamily buildings, while developing other elements that were underdeveloped or missing.

Phase III was to utilize an existing environmental assessment tool to evaluate the green performance of four existing multi-family buildings. The "GBC '98 Assessment Manual: Volume 4: Multi-Unit Residential Buildings" was chosen as the assessment methodology. Three of the buildings were recently constructed advanced buildings, while the fourth building was a market-ready condominium built in the early 1980's with a number of advanced features and amenities for the times.

Prepared by Caneta Research Inc., Lowans & Stephen, Young + Wright, Innovative Management Solutions. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Cate Soroczan. Ottawa: CMHC, 1998 i.e. 2000. ca 64 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

ENVIRONMENTAL IMPACT ASSESSMENT TOOLS FOR MULTI-UNIT HOUSING

This project has assessed 6 different environmental assessment tools to determine their applicability to multi unit residential buildings. The best features and limitations of each tool have been identified and transmitted to the authors of each tool. Four innovative buildings were then assessed by one of the tools. This work was presented to the Green Building Challenge '98 (GBC) Committee as part of CMHC's contribution to the development of the residential component of the Green Building Challenge overall evaluation criteria for buildings of all types. Further work is being done to assess the "greenness" of buildings and the associated costs and savings by utilizing a green design.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1872 0200
STATUS : Ongoing Project

EXPORTING CMHC'S TECHNICAL SEMINAR SERIES

Over the past fifteen years, CMHC has undertaken research work into the development of technologies for high-rise buildings. The work could be marketable in the US and other countries where they are being faced with similar concerns regarding energy efficiency, airtightness, noise control and rain penetration control of the building envelope. CMHC's research activities into the building sciences were undertaken by Canadian consulting firms who have gained considerable knowledge that could also be marketed in other countries. A pilot series of seminars is being developed to be conducted in the USA in partnership with the Building Environmental Thermal Envelope Council with funding from the Dept. of Energy.

CMHC Project Officer : *Jacques Rousseau*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1928 0200
STATUS : Ongoing Project

FINANCIAL CONTRIBUTION TOWARDS THE INTEGRATED DESIGN CHARRETTES AT CONSTRUCT CANADA

The objective of this project is to prepare and deliver four parallel workshops, each to deal with integrated design process applicable to the following scenarios: a) a new mixed-use building, b) the renovation of a multi-unit residential building, c) the renovation/retrofit of a commercial building and d) the design of a large new institutional building.

CMHC Project Officer : *Sandra Marshall*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 0840 0306016

STATUS : Ongoing Project

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls are being performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls but further investigation will be required.

CMHC Project Officer : *Duncan Hill*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1730 0300003

STATUS : Ongoing Project

HIGH-RISE APARTMENT REPAIR NEEDS ASSESSMENT IN THE FORMER CITIES OF TORONTO AND YORK

Recognizing that rental buildings are aging, the condition of high-rise rental housing has been a concern for over 15 years. Previous studies and anecdotal reports on repairs have suggested costs ranging from less than $10,000/unit to over $20,000/unit. What has been absent from the evaluations to date has been a rigorous assessment of actual buildings for real costs for repair. This study provides that assessment.

The study of a sample of 63 high-rise buildings was completed using an evaluation protocol developed to quickly gather information in a format that was data-entry ready. Analysis of the data on seven major building systems, comprised of 21 different major building subsystems, was conducted using a Microsoft Access-based database. This report provides a summary of the findings, including the typology of the building, typical complaints, and repair costs on a per-unit basis. In addition, information on energy conservation measures, albeit minimal within the scope of this study, is appended.

To assist in assessing the condition of the buildings as a whole, a new rating tool was devised. The 'rating' value was assessed for each system and then calculated for each building to help establish an appropriate gauge of the condition of the building. The building condition could be incorrectly gauged if per-unit costs alone were used as the measure of condition. The rating tool is expected to be useful in the future to compare conditions found now and later, and to compare the conditions of buildings in different cities.

The findings are described and cross-relationships are made against the following criteria:

1. The four age groups surveyed, i.e. pre-1960's, 1960's, 1970's, and post-1970's buildings.
2. The four time frames for repair, i.e. Immediate, 1 to 2 years, 3 to 5 years, and 6 to 10 years.

The seven primary building systems and 21 building subsystems are used to establish a typology for the buildings within the four age groups.

Prepared by Gerald R. Genge, Building Consultants Inc. Prepared for Canada Mortgage and Housing Corporation and the former cities of Toronto and York. CMHC Project Officer: Sandra Marshall. Ottawa: CMHC, 1998, i.e. 2000.

NOTE : Aussi disponible en français sous le titre : *Évaluation des besoins de réparation des tours d'habitation dans les anciennes villes de Toronto et de York.*

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

HIGH-RISE RENTAL RETROFIT COSTS AND IMPACTS

The recently completed assessment of repair needs for high-rise rental apartments in York and Toronto showed that about 9% of apartment buildings can expect very high repair costs. With the City of Toronto, this study would look at the problems faced by the owners and occupants of these buildings with high-cost-to-repair to determine the factors which have led to these incipient high repair costs and to propose possible avenues of resolution to these burdens. Examples of buildings which have had to deal with these problems will be sought as case studies. It is expected that the study will provide property managers with evaluation tools to improve their understanding of conflicting durability and financial constraints. The study is scheduled for completion by the end of 2000.

CMHC Project Officer : *Sandra Marshall*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

IDEAS HIGH-RISE CHALLENGE

The IDEAS Challenge is intended to demonstrate the benefits of innovative design and technology in the operation of high-rise residential buildings. The Challenge focuses on five aspects of building design: envelope durability, energy efficiency, indoor air quality, environmental conservation and accessibility. One project in Montreal is built and monitoring is being carried out. Acoustic details have been tested. Two booklets are available, one that describes the IDEAS Challenge and the features of the five finalist projects and another which is a "Better Building" guide to innovation in the design and construction of high-rise residential buildings. The design process of a building in Dundas, Ontario which is exploring the adaptation of the IDEAS Challenge goals and details of CMHC's Best Practice Guide, is being documented. A project in Edmonton is also ongoing.

CMHC Project Officer : *Sandra Marshall*

CIDN : 0840 0300

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

MECHANICAL AND ELECTRICAL SYSTEMS IN APARTMENTS AND MULTI-SUITE BUILDINGS: A PRACTITIONER'S HANDBOOK

An advisory document entitled "Mechanical and Electrical Systems in Apartments and Multi-Suite Buildings" is now available, in both official languages to recommend "good engineering practice" for designers, owners and consultants. The publication covers basic building science issues as they relate to mechanical systems, design techniques useful for space heating, cooling, ventilation, plumbing and electrical systems. In some cases fundamental design steps are provided but the manual is not meant to replace basic engineering design procedures. Desirable design and installation features are described that will provide for efficient and effective operation of multi-unit residential buildings. The primary readership is HVAC system designers with university or college training, installers, educators and building code officials.

Prepared by Wayne Webster, the principal author; Cedric Trueman, the associate author; and Dan Dederer, the principal technical resource for Chapter 9. Ottawa: Canada Mortgage and Housing Corporation, c1999.

Order number: NE2049 **Price: $24.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Installations mécaniques et électriques des immeubles résidentiels : guide pratique*

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS

The innovative mechanical and electrical energy producing systems in a multi-unit residential buildings project in Toronto were monitored and assessed to determine their economic viability. The project involved the assessment of the buildings cogeneration, space heating, absorption chilling, domestic hot water and ventilation systems and a review of natural gas and electricity use. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided electrical use and other considerations was determined. An inspection of the individual space conditioning systems within the suites was also performed. The findings of the investigation showed that the operation costs (fuel use, maintenance and repair) of the cogeneration system was not economically viable. Key findings include the observation that the system was not making full use of the heat generated by the cogeneration systems. The report estimated that even if all of the heat was recovered from the cogeneration system, the benefit of the system to the building's owners would be marginal. Given that the building embodies some of the most advanced technologies that allow for energy efficiency, cascading and recovery, operation costs should have been low relative to conventional buildings. CMHC is preparing to initiate a follow-on project to further investigate the reasons why the innovative systems employed in the building failed to meet their potential and whether or not there is opportunity to rectify the situation.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1260 0800001
STATUS : Ongoing Project

MONITORING THE RETROFIT OF A RESIDENTIAL HIGH-RISE BUILDING ENVELOPE

A case study of a 20 year old high-rise building in Toronto has been undertaken to document and monitor the performance of the retrofitted walls. In November 1997, an Exterior Insulating Finish System (EIFS) was installed over the precast block walls as part of an overall building renewal project. Instrumentation to monitor heat, air and moisture regimes within the wall sections was installed which is currently being monitored for one year to assess the performance of the retrofit strategy. Preliminary results indicate that the walls are performing in a satisfactory manner in that the thermal insulation value of the wall assembly has been increased, there is less likelihood that condensation problems within the wall structure will occur and the ability of the wall to shed rain water has been increased. An additional study of the impact of the retrofit on the energy consumption of the building is being considered.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1602 0200001
STATUS : Ongoing Project

OPERATING AND MAINTENANCE BOOKS FOR MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT BUILDINGS

Two publications, currently in 'draft' stage, on improving the operating performance of modern residential building systems have been developed. The first document, for owners and managers, links good operating practices with desirable investment strategies. The second, for building operating and maintenance staff, updates information on mechanical and electrical systems and incorporates preventative maintenance checklists for multi-unit residential buildings.

CMHC Project Officer : *Jacques Rousseau*
CIDN : 1774 0300004
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

PERFORMANCE MONITORING OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING

A high-rise residential building is being constructed in Dundas, Ontario that will utilize many innovative design strategies, products and systems to improve durability, indoor environment, energy and water efficiency, resource use and environmental impact. In order to assess the cost-benefits of each measure, CMHC, in cooperation with Natural Resources Canada, will be undertaking an extensive year long monitoring program in the building. Energy and water consumption, building envelope, indoor air quality and ventilation system performance will be assessed in order to better understand the technologies adopted in the project. A report will be issued that describes the building project, the individual measures adopted to improve performance, and the impact on the overall performance of the building.

CMHC Project Officer : *Sandra Marshall, Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project

PERFORMANCE MONITORING: BRICK VENEER/STEEL STUD (BV/SS) WALL SYSTEM: PHASE 4

Phase 4 of this study involves a fourth year (1997/98) of in-situ performance monitoring of a BV/SS wall system, with respect to air and moisture movements after the top vents in the brick veneer wall have been opened. The performance of a wall is being monitored using temperature, moisture and air pressure sensors connected to an automatic data logging system. Preliminary results indicate that the vent holes did not contribute to drying the wall but increased the moisture loading of the brick veneer. Even though the BV/SS wall system is typical of current practices and workmanship was satisfactory, the results of the study demonstrate that performance problems exist that may lead to significant distress over the long term. The more serious performance problems identified in this study are due to design weakness demonstrating the need to improve design and construction standards. Phase 1 & 2 reports are available from CMHC. The results of the Phase 3 research demonstrated no significant difference from Phase 1 and 2 and the Phase 4 draft report has been received and is being revised.

CMHC Project Officer : *Jacques Rousseau*

CIDN : 0787 0300001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

QUALITY ASSURANCE PROTOCOL FOR WOOD FRAME BUILDING ENVELOPES IN BRITISH COLUMBIA

The purpose of this project is to demonstrate the Quality Assurance Protocol for Wood Frame Envelopes in BC. A consultant has been retained to work with Polygon Construction to implement the Quality Assurance Protocol. A draft report should be available by the end of September.

CMHC Project Officer : *Jacques Rousseau*

CIDN : 1816 0300011

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

QUALITY BY DESIGN: A QUALITY ASSURANCE PROTOCOL FOR WOOD FRAME BUILDING ENVELOPES IN BRITISH COLUMBIA

Quality by design was commissioned as the Quality Assurance Protocol by Canada Mortgage and Housing Corporation in order to establish a management system for the assurance of quality of the exterior of multi-storey wood frame buildings located in the coastal climate of British Columbia. This is part of the initiatives undertaken by the Building Envelope Research Consortium, of which CMHC is a prominent member, to address the "leaky condo" issue as it pertains to new construction.

The Quality Assurance Protocol applies to quality assurance in: design, project and building site management, construction, warranty and maintenance.

This document outlines the proposed Quality Assurance Protocol and includes a generic Quality Manual. It brings together thinking about building envelope quality from a representative sample of all of the design and construction professionals who produce building envelopes. It is designed to be practical and usable. It is designed as a basis to be built onto by designers, builders, suppliers and installers of the building envelope. It is not exclusive nor does it exclude anyone involved in building envelopes from "buying in". It is based on a recognized international standard, ISO 9001:1994, which is a quality system standard likely to become prevalent in Canada in the next few years. Persons adopting the Protocol will find it eases their future adoption of ISO 9001.

Although this Protocol is focused on the exterior of multi-storey wood frame buildings, i.e., their "building envelope", it has been designed such that its use could be expanded to other building forms as well as to other aspects of design and construction practice.

Prepared by Pro Pacific Architecture Limited. Principal investigators: Brian Palmquist and William A. Gies, assisted by Arc Rajtar. CMHC Project Officers: Jacques Rousseau and Mark Salerno. Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions..

RAIN PENETRATION CONTROL

This document, currently in the 'draft' stage, provides the latest information on controlling the penetration of rain into walls. It is based on CMHC's research and other information regarding rain penetration control. The work is being funded in collaboration with the American Architectural Manufacturers Association. A copy of the draft can be obtained from Jacques Rousseau.

CMHC Project Officer : *Jacques Rousseau*
CIDN : 1258 0300004
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

RAINSCREEN 2.1 COMPUTER PROGRAM

The RAINSCREEN program has been developed to assist in the design of rainscreen pressure equalized wall assemblies. A new version of the RAINSCREEN computer program, including a tutorial program and a manual that will be much more user-friendly has been produced and is available on the web at the following address:

http://www.cmhc-schl.gc.ca/Research/HighRise/files/rainscreen.html

STATUS : Completed Report
AVAILABILITY : On the web at the following address:
http://www.cmhc-schl.gc.ca/Research/HighRise/files/rainscreen.html

REMEDIATION OF MOISTURE TROUBLED WOOD FRAMED BUILDINGS IN THE COASTAL CLIMATE OF B.C.

This project researched and prepared diagnostics and recommended procedures for the cost effective rehabilitation of leaking condominiums in the lower mainland of B.C. The project developed a standard method of damage assessment, and outlines the rehabilitation steps including considerations for technical issues, code compliance, financial implications and practicality of repair. Two documents are being finalized, one for consultants, and the other for property managers and owners of condominiums or multi-unit residential buildings. The project is completed and the preliminary documents are available.

CMHC Project Officer : *Ken Ruest, Mark Salerno*
CIDN : 2061 0200
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

RENOVATION OF AN APARTMENT BUILDING WITH SOLID MASONRY WALLS

A 90 year old building with solid clay brick walls has been gutted and renovated into a multi-family residential building for low income persons. The renovation involved the addition of thermal insulation to the inside of the building envelope, the application of stucco to the exterior of three of the four sides of the building, restoration of the front masonry facade, installation of a mechanical ventilation system with ventilation in each room, and a combination hydronic baseboard/radiant floor heating system. This renovation was of particular interest as it represented a unique opportunity to evaluate the impact of insulating formerly un-insulated solid masonry walls - a subject of much interest and controversy within the building rehabilitation industry. The project also demonstrated how the most current understanding of building envelope durability, heating and ventilation systems and indoor air quality could be implemented within an otherwise unremarkable renovation project.

The building envelope was monitored for thermal and moisture performance. Energy, water use and indoor air quality were also monitored in the renovated building.

Based on 15 months of measured readings of wood moisture pins placed in the walls and attic of the retrofitted building, the rehabilitation has been successful in reducing wall heat flow by conduction while maintaining safe moisture content levels in the wood members. The indoor air quality in the building was greatly improved through the use of mechanical ventilation system with ventilation provided to each room in each apartment.

Prepared by: Dr. Robert Dumont, Larry Snodgrass, Jerry Makohon, Building Performance Section Saskatchewan Research Council. SRC Project Manager: Dr. Robert Dumont. Prepared for: High-Rise Innovation Center, Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Duncan Hill. Ottawa: CMHC, 1999.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
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Tel.: 613-748-2367 or 1-800-668-2642
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REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is documenting repair and retrofit activities in multi-unit residential buildings. The first 30 case studies will document building characteristics, the type of problems that prompted the repairs and retrofits, costs, benefits, etc. A wide range of case studies will be included to reflect regional repair and retrofit priorities. The studies will be useful for other members of the multi-unit residential building industry to refer to when considering similar projects. An information template that can be used as a guideline for the type of information that should be extracted from a repair or retrofit project in a multi-unit residential building has been developed. CMHC is currently soliciting the building industry for case studies and will retain consultants to provide the necessary documentation. A compendium of case studies will be assembled and made available

***CMHC Project Officer** : Luis de Miguel*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1782 0300001-7

STATUS : Ongoing Project

STUCCO-CLAD WALL DRYING EXPERIMENT, VANCOUVER, BRITISH COLUMBIA: RESEARCH REPORT

The deterioration of wood framed walls in southwestern British Columbia is a consequence of an inability of the exterior walls to manage rainwater. The effective performance of these walls will ultimately depend on the combination of limiting the wetting of wall components that are susceptible to deterioration, and enhancing the drying of these components should they become wet. The rainscreen principle is a design approach that will limit the wetting of wall components, thus achieving the first half of the combination. However, the unresolved issue is whether it will enhance the drying of these components should they become wet.

An experiment was conducted to measure the effect of drainage cavity design on the drying of water from insulated stud cavities. Seven test specimens, five wood framed and two steel framed, were included in the experiment. All were finished with stucco cladding. Temperature and vapor pressure difference were controlled across the specimens, but other environmental forces such as solar and wind effects were not simulated. After a measured quantity of water was injected into the stud cavities, the drying of the specimens under controlled conditions was monitored for 5-1/2 months.

The following conclusions are drawn from the experiment:

- The drying process for all specimens was very slow and took months to achieve any significant effect.
- Improved drying of water that penetrates into the stud cavity is not a benefit of the rainscreen design. The drying rate was not affected by cladding design, either face sealed or rainscreen, nor by drainage cavity design. It also follows that the drying rate will not be improved by the cladding system type (stucco, vinyl siding, brick veneer, etc.).
- Moisture movement within the specimens was very limited. From a practical perspective, where water enters a wall is where it stays and a small leak can lead to a local problem.

This experiment has shown that design for effective rainwater management is important since it is essential that little if any water be permitted to get into the stud cavity.

Prepared by Morrison Hershfield Ltd. CMHC Project Officers: Jacques Rousseau and Mark Salerno. Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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TESTING OF DYNAMIC BUFFER ZONE (DBF) METHOD ON 312 CUMBERLAND STREET, OTTAWA

This project's objective is to proceed with testing a Dynamic Buffer Zone (DBF) method in the air space behind brick cladding. The DBF consists in introducing mechanically dry, temperate air in the air space behind the brick cladding. The dry air absorbs the condensation and should increase the durability of the wall assembly. The wall will be monitored for a year.

CMHC Project Officer : *Luis de Miguel*   ***CIDN*** : 0411 0305002
Division : Research Division   ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available

WIND-DRIVEN RAIN STUDY FOR THE GOVERNOR'S ROAD PROJECT, DUNDAS, ONTARIO

This report on the study of wind-driven rain action on the Governor's Road Project in Hamilton, Ontario provides the following information:

- wetting patterns for the Governor's Road Project building without cornice protection;
- wetting patterns for the Governor's Road Project building with cornice protection; and
- a cornice effectiveness evaluation.

A three-dimensional numerical model of the project building geometry, and the wind and rain conditions were designed using commercial computational fluid dynamics software, FLUENT 4.3 (Users Guide, 1996). The building model was numerically tested in atmospheric turbulent boundary layer flow conditions for one dominant wind direction.

Prepared by H. Hangan and D. Surry. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, c2000. (Housing Technology Series; Research Report)

NOTE : Aussi disponible en français sous le titre : *Étude de la pluie poussée par le vent portant sur l'ensemble résidentiel de Governor's Road, Dundas (Ontario)*

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
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Tel.: 613-748-2367 or 1-800-668-2642
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WOOD-FRAME ENVELOPES IN THE COASTAL CLIMATE OF BRITISH COLUMBIA. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

Building in BC's coastal climate has special challenges -- and this 256 page guide is the most up-to-date, authoritative information available to help meet those challenges. This guide provides the most comprehensive technical information on how to build to withstand the conditions of BC's coastal climate.

The guide is intended to provide guidance, primarily to designers, for the design of the building envelopes of multi-unit wood-frame buildings in the coastal climate zone of British Columbia. The guide should also be useful to the construction industry in general, encouraging an understanding of the behaviour and performance of building envelope assemblies. Much of the material in the guide may also be applicable to other climate zones and building types.

Although the guide is intended to reflect good practice in general, its primary focus is on the management of moisture, since moisture-related performance problems prompted this initiative. The guide therefore does not deal specifically with structural, acoustic or fire and safety issues that may also have an impact on the design of the building envelope.

The information in the guide includes behaviour of wood in construction, moisture source control strategies, heat flow mechanisms, typical envelope assembly characteristics, and materials for inclusion in specifications, quality assurance strategies, maintenance and renewal strategies and more than fifty-three state-of-the-art CAD details showing several air barrier strategies, all included on the companion CD-ROM.

Endorsed by the Canadian Wood Council (CWC) and the Building Envelope Research Consortium (BERC).

Prepared by RDH Building Engineering Limited in joint venture with Morrison Hershfield Limited. The two dimensional drawings were prepared by Hewitt Tan Kwasnicky Architects Inc. and the chapter on Behaviour of Wood was prepared by Don Onysko. Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2178 **Price: $89.00 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Enveloppe de bâtiments à ossature de bois dans le climat littoral de la Columbie-Britannique, Guide des règles de l'art : technologie du bâtiment.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

WOOD FRAME ENVELOPES. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

Designer, builders, building owners and managers who consult this guide should gain a general understanding of the principles and practical considerations of designing and constructing wood frame envelopes. The Guide emphasizes the best residential construction practice details and specifications used in design offices and on construction sites across Canada.

The information includes the behaviour of wood in construction, moisture control strategies, heat flow mechanisms, typical envelope assembly characteristics, components and materials for inclusion in specifications, quality assurance, maintenance and renewal strategies. More than 30 clearly drawn construction details on CD-ROM are easy to download into a CAD program. Metric and imperial measures, French and English in different layers.

Prepared for Canada Mortgage and Housing Corporation by Otto Bryden Erskine Martel Architects Inc., and subsequently by Otto and Erskine Architects Inc., in joint venture with Halsall Associates. The National Research Council of Canada, the Canadian Home Builders' Association, the Canadian Wood Council and the New Brunswick Home Builders' Association assisted in development of this book. Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE6921 **Price: $89.00 + GST and handling charges.

NOTE: Aussi disponible en français sous le titre : *Enveloppe de bâtiments à ossature de bois. Guide des règles de l'art : technologie du bâtiment.*

STATUS : Completed Report

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APPLICATION OF STRUCTURAL STEEL TO SINGLE-FAMILY RESIDENTIAL CONSTRUCTION

This study is an investigation of the use of structural steel in single-family residential construction, and an analysis of its applicability to Canada, taking into account technical requirements, cost-effectiveness, and sustainability.

With the rise of housing costs, global competition, and increasing environmental concerns, new systems and innovative uses of material are required to supplement the existing construction methods. Numerous studies have demonstrated the potential of steel for building and its advantage in terms of price, performance, and physical properties. Residential projects in steel are usually built with lightweight metal framing systems. Structural steel is seldom used, although it offers additional advantages in terms of performance, economy, flexibility, and speed of construction, as well as a wide availability of skills, trades, and experience from the commercial and industrial building sector.

The purpose of the study is to provide to decision-makers in the building industry a clear view of the possibilities offered by the application of structural steel to housing.

The 200-page report addresses the following topics:

- steel and metal building systems in the context of housing;
- existing steel houses worldwide and in Canada;
- source of information for steel technology;
- compliance with building codes;
- Canadian steel suppliers and trades;
- prototype design of a steel house;
- steel house and sustainability.

Prepared by Michel de Spot, Node Engineering Corp. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
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Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
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International clients see page 9 for order instructions.

BUILDER'S WORKSHOP SERIES TRAINER'S MANUAL

The objective of this project was to revise and update the three remaining modules for inclusion in the Builder's Workshop Series Trainer's Manual, (i.e. Indoor Air Quality, Ventilation and Noise Control). The first four modules; Foundations, Wall Assemblies, Floor Assemblies, and Roof and Ceiling Assemblies have already been updated and are now in publishing phase. The IAQ, Ventilation and Noise Control training modules have been updated to coincide with the applicable information in Building Solutions: A Problem Solving Guide for Builders and Renovators and with current building codes and practices. These modules were developed for presentation as two to three hour workshops, suitable for delivery at builder forums. The Trainers Manual is anticipated to be available early in 2000 and will be made available upon request where the delivery agent has plans to deliver the workshop.

CMHC Project Officer : *Darrel Smith*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2123 0200001

STATUS : Completed Report

CD-ROM VERSION OF THE CANADIAN WOOD-FRAME HOUSE CONSTRUCTION

The purpose of this project is to design and develop an internet based CD-ROM version of CMHC's Canadian Wood-Frame House Construction publication complete with a number of multimedia enhancements and other special features such as video clips, 4D illustrations, and a joist and beam calculator. It will also include the Glossary of Housing Terms with links from Canadian Wood-Frame House Construction, to serve as an illustrated glossary. It is anticipated to be available by Fall 2000.

CMHC Project Officer : *Darrel Smith*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2123 0200001

STATUS : Ongoing Project

COMPARATIVE STUDY OF ALTERNATIVE FRAMING AND BUILDING SYSTEMS FOR LOW-RISE HOUSING

The purpose of this study is to compare various alternative framing and building systems for low-rise housing in use today. These systems will include insulated concrete forms, straw bale, structural insulated panels, stack wall, concrete block, post and beam, log and light gauge steel. The results of this study will be beneficial to those in the industry to help them make better informed decisions on choice of framing and building systems. This study will take an inventory of and investigate the differences, benefits and limitations of the various building systems which are currently in use as compared to the typical wood-frame, stick-built construction of low-rise housing. It will consider the advantages and/or disadvantages of the various systems. The study will examine all of the factors to be considered by a builder or homeowner to help them understand the differences between the available system choices so they may evaluate and select systems appropriate to their clients, house designs, trade practices and skills, and regions.

CMHC Project Officer : *Darrel Smith*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2119 0200001

STATUS : Ongoing Project

COMPREHENSIVE ANALYSIS OF SELF-BUILD HOUSING EXPERIENCES

The objective of this report is the development of a comprehensive analytical framework to evaluate self-build experience both in Canada and abroad and to determine the potential transferability of international initiatives to the Canadian context. The mandate was to develop a practical tool for the comparative analysis of self-build initiatives, a tool which could identify the major factors that contribute to the success or failure of any given initiative. The focus of the self-build initiatives chosen for analysis is primarily on urban multi-family and rehabilitation examples.

Six categories were selected for use in the analytical framework as a method of classifying the factors that are essential to the success of an evaluated self-build initiative. These categories are: organization; financing; design; construction; post-occupancy; and institutional context.

Chapter 1 of the report defines self-build, differentiating it from the concept of self-provision and from the broader context of self-help. The second chapter outlines the numerous issues relevant to a discussion of self-build and provides a justification for the selection of the six categories used in the evaluative framework. The analytical framework itself is then described: the Stage 1 level of analysis which proceeds by submitting a chosen self-build initiative to a series of 30 critical questions, and the Stage 2 level of analysis which provides a more detailed evaluation by submitting a selected initiative to a total of 146 questions. A brief description is provided for each of the 30 critical questions, and the 146 detailed evaluation questions are listed.

The third chapter presents a profile of the 30 self-build initiatives that were analyzed according to the Stage 1 and Stage 2 levels of analysis.

Conclusions are presented in the fourth chapter, followed by a complete bibliography. The appendices to the report include a guidebook to the analytical framework to help the user identify either key positive factors or weaknesses/failings in an examined initiative and to receive advice or guidance for further consideration in terms of the initiative's validity and its applicability to the Canadian context.

Prepared by Avi Friedman, Steve Pomeroy, David Krawitz, and Alexander Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Scherlowski. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0357

NOTE : Aussi disponible en francais sous le titre : *Analyse détaillée d'expériences en autoconstruction*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

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CONTRACTOR TRAINING COURSE ON THE CONSTRUCTION AND RESTORATION OF DURABLE BUILDING ENVELOPES FOR RESIDENTIAL WOOD-FRAME BUILDINGS LOCATED IN THE LOWER MAINLAND OF BC AND VANCOUVER ISLAND

This is a partnership project between the Canadian Home Builder's Association of British Columbia (CHBA/BC), the Homeowner Protection Office (HPO) of B.C. and CMHC. The purpose of the project is to develop and pilot a course curriculum and course training materials to train general contractors and subtrades in building construction practices that would enable them to construct highly durable building envelopes for new residential wood-frame buildings located in the lower mainland of British Columbia and Vancouver Island and to restore and upgrade the envelopes of existing buildings. The end product will be a Trainer's Manual complete with all the necessary training aids, and a Participant's Manual. The course will be tailored to meet the needs of the residential construction industry and would use a full range of teaching methods to ensure that all participants absorb the information provided. The project is expected to be completed by early 2001.

CMHC Project Officer : *Darrel Smith, Mark Salerno* **Division :** Research Division

AVAILABILITY : Publication is not available ***STATUS*** : Ongoing Project

CSA Z-824 STANDARD

The objective of this project is to take the existing draft of the CSA Z-824 Log Standard, rationalize the organization of the standard contents, and produce a draft for comment.

CMHC Project Officer : *Mark Holzman* ***CIDN*** : 1811 0300001

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

DEVELOPMENT OF GENERIC ENGINEERED DETAILS FOR THE CONSTRUCTION OF RESIDENTIAL TALL WALLS

Part 9 of the Alberta Building Code (1997) defines maximum allowable heights for exterior loadbearing walls based on their physical characteristics and the loads they support. The code, however, only specifies requirements for walls up to approximately 12 feet in height. Walls exceeding that height must be individually engineered. Significant time and expense could be saved through the availability of generic, engineered data which would allow builders in Alberta to select appropriate material and installation configurations for the tall wall requirements incorporated in their various projects. The purpose of this project was to develop such data.

Several general configurations were identified for analysis. These configurations included both solid walls and walls with varying window layouts. The range of wall dimensions was 7 to 16 feet in width by 10 to 20 feet in height. Some appurtenant components generally thought to provide additional support for tall walls were also included in the analysis. These included horizontal feature shelves, fireplaces located in corners and intra-span, interior partitions, and hip roofs.

Developmental work followed generally accepted principles of limit states design. Load carrying capacity and lateral deflection were defined as the governing limit states. The general design philosophy encompassed examination and classification of live loads throughout the province, and development of tables that link the load classification at a particular location to allowable tall wall characteristics for that location.

Two types of tall walls were developed. The first case - tables which identify the maximum widths of loadbearing walls of given height - was chosen as a means of addressing the option to construct tall walls in two vertical lifts. The second case - tables that identify the maximum height to which a loadbearing wall may be built - addresses the option of building tall walls with full height stud members. In the first case, stress and deflection due to wind loads constituted the governing conditions. Allowable deflection was set at 1/180 of the width of the wall. In the second case, the combination of axial loading and bending moments caused by wind loading was considered, and either stresses or deflections governed the allowable height of the wall, depending on load combination.

The structural contributions of the appurtenant components studied were found to be minimal. From the generic perspective, whatever contributions could be afforded by these items would be lost to design allowances that would have to be made to compensate for the large number of variables associated with their installation. These variables include vertical and horizontal positions on the wall, materials used, and fastening methods used. Details describing these items would have to be intricate and the potential for another field variable - misapplication of intended specifications - would likely be introduced.

The tables developed within the scope of this project allow extension of the existing limits of the Alberta Building Code, 1997 edition. Table 9.23.10.1 of the code allows walls up to approximately 12 feet in height to be built without professional design input. Properly utilized, these tables allow the construction of walls up to approximately 25 feet in height (dependent upon load conditions) to be built in Alberta without professional design input. Some situations will exist where the tables do not address the requirements of a particular project or a particular project cannot comply with the conditions accompanying the use of the tables, and in these circumstances, individual professional design will remain a requirement.

Prepared by Campbell Woodall & Associates Consulting Engineers Ltd. CMHC Project Manager: Darrel R. Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
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Tel.: 613-748-2367 or 1-800-668-2642
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DIE KANADISCHE HOLZRAHMENBAUWEISE and FACHAUSDRÜCKE IM HÄUSERBAU

This kit includes the German language versions of the "Canadian Wood-Frame House Construction" and "Glossary of Housing Terms" for $29.95.

"Canadian Wood-Frame House Construction" is the 'bible' on building wood-frame houses in Canada. A step-by-step guide from excavation to the finishing touches, this ideal learning tool and essential job-site reference is indispensable for builders, renovators, students and do-it-yourselfers. Updated to conform to Canada's National Building Code requirements, it includes new illustrations and handy sizing tables; metric and imperial measurements; Planning ahead and Checking Back notes; plus healthy housing tips to improve indoor air quality and minimize environmental impacts.

"Glossary of Housing Terms" is an A-to-Z of housing terms! This thoroughly revised, comprehensive dictionary lists more than 1,200 housing definitions. Canada's authoritative reference book for builders, students and the informed homeowner for more than 30 years.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NG2420 **Price: $29.95 + GST and handling charges.

NOTE: Also available in English, French, Spanish and Russian editions.

STATUS : Completed Report

AVAILABILITY : This package deal will be available for sale at the price of $29.95 through our 1-800-668-2642 in Canada. For international clients please call (613) 748-2003; credit card only orders will be accepted.

FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMMISSIONING GUIDE FOR NEW HOUSES

The purpose of this project is to confirm the importance and determine the feasibility of developing a commissioning guide for builders and buyers of new houses. If developing such a guide is possible and desirable, the study would indicate necessary content, and identify possible options for its production. One option is that the guide become a part of CMHC's Home Owners Manual. This feasibility study will be completed by December 2000.

CMHC Project Officer : *Darrel Smith*

Division : Research Division

AVAILABILITY : Publication will not be published

STATUS : Ongoing Project

NEW

FEASIBILITY STUDY ON THE DEVELOPMENT OF A GUIDE FOR ENGINEERED WOOD I-JOIST FLOOR SYSTEMS

The purpose of this project is to confirm the need for and determine the feasibility of producing a generic guide for builders on the selection and proper installation of engineered wood I-joist floor systems. As a prerequisite to possibly developing a guide, the study will identify information required and available and effective ways that a guide could be produced. Should this study confirm the need, development could begin in Spring 2001.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication will not be published
STATUS **:** Ongoing Project
NEW

LOG HOMES: FREQUENTLY ASKED QUESTIONS. ABOUT YOUR HOUSE; CE 21

This 4 page fact sheet deals with the unique design and building considerations of log homes. Its coverage of frequently asked questions and CMHC's answers include the following: -- what to look for in a log home contractor or dealer and what are some of the questions to ask them?-- what to look for in a building site?-- how does the cost of building a log home compare to the cost of building a conventional frame house?--what are some of the benefits of owning a log home?-- what are the differences in the corner systems of a log house?The fact sheet also deals with the concerns of shrinkage and settling, moisture, insects and fungi, refinishing, the installing of plumbing, electricity and heating systems in log homes and their energy efficiency.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 4 pages

Note: Aussi disponible en français sous le titre : *Foire aux questions - maisons en rondins*

STATUS : New Completed Fact Sheet
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
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Email: chic@cmhc-schl.gc.ca
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MANUAL DE CONSTRUCCIÓN DE VIVIENDAS CON ARMADURA DE MADERA - CANADA AND GLOSARIO DE TÉRMINOS DE CONSTRUCCIÓN DE VIVIENDAS

This kit includes the Spanish language versions of the "Canadian Wood-Frame House Construction" and "Glossary of Housing Terms" for $29.95.

"Canadian Wood-Frame House Construction" is the 'bible' on building wood-frame houses in Canada. A step-by-step guide from excavation to the finishing touches, this ideal learning tool and essential job-site reference is indispensable for builders, renovators, students and do-it-yourselfers. Updated to conform to Canada's National Building Code requirements, it includes new illustrations and handy sizing tables; metric and imperial measurements; Planning ahead and Checking Back notes; plus healthy housing tips to improve indoor air quality and minimize environmental impacts.

"Glossary of Housing Terms" is an A-to-Z of housing terms! This thoroughly revised, comprehensive dictionary lists more than 1,200 housing definitions. Canada's authoritative reference book for builders, students and the informed homeowner for more than 30 years.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NS2449 **Price: $29.95 + GST and handling charges.

NOTE: Also available in English, French, German and Russian editions.

STATUS : New Completed Report

AVAILABILITY : This package deal will be available for sale at the price of $29.95 through our 1-800-668-2642 in Canada. For international clients please call (613) 748-2003; credit card only orders will be accepted.

RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS

This study will draw up an inventory of the problems associated with the reactions of the pyrite (iron sulphide) contained in the backfill stone used under slabs in residential properties. Two hundred houses inventoried in three Montréal South-Shore municipalities will be visited under the CTQ-M200 protocol developed as part of the work of the Quebec technical committee on pyrite-related problems. The results of the study will identify possible causes and potential affordable solutions. The objective is to provide the industry with a more global vision of this new situation.

***CMHC Project Officer** : Jacqueline Meunier-Bureau*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

NEW

RESIDENTIAL DECONSTRUCTION MANUAL

The intent of this manual is to provide project managers (architects, engineers, interior designers, associated technicians and technologists, contract administrators, contractors, and site supervisors) involved in residential (single family and multi-unit) demolition with a reference tool to assist them in the economic feasibility assessment, planning and supervision of deconstruction.

Prepared by Derek Badger. CMHC Project Manager: Darrel R. Smith. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SEUILS D'ACCÈS AUX BALCONS D'IMMEUBLES D'HABITATION : PROBLÉMATIQUES ET PISTES DE SOLUTIONS

The objective of this project was to demonstrate to architects, builders, developers and regulatory agencies the possibilities of producing easy-access thresholds to balconies in new or renovated residential buildings.

Prepared by Pierre Richard Architecte, Archiconcept inc. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

STROITEL 'STVO DEREVYANNYKH KARKASNYKH DOMOV V KANADE and GLOSSARIY TERMINOV PO ZHILISHCHNOMU STROITEL' STVU

This kit includes the Russian language versions of the "Canadian Wood-Frame House Construction" and "Glossary of Housing Terms" for $29.95.

"Canadian Wood-Frame House Construction" is the 'bible' on building wood-frame houses in Canada. A step-by-step guide from excavation to the finishing touches, this ideal learning tool and essential job-site reference is indispensable for builders, renovators, students and do-it-yourselfers. Updated to conform to Canada's National Building Code requirements, it includes new illustrations and handy sizing tables; metric and imperial measurements; Planning ahead and Checking Back notes; plus healthy housing tips to improve indoor air quality and minimize environmental impacts.

"Glossary of Housing Terms" is an A-to-Z of housing terms! This thoroughly revised, comprehensive dictionary lists more than 1,200 housing definitions. Canada's authoritative reference book for builders, students and the informed homeowner for more than 30 years.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NR2421 **Price: $29.95 + GST and handling charges.

NOTE: Also available in English, French, Spanish and German.

STATUS : Completed Report

AVAILABILITY : This package deal will be available for sale at the price of $29.95 through our 1-800-668-2642 in Canada. For international clients please call (613) 748-2003, credit card only orders will be accepted.

USE OF CONVENTIONAL CROSS BRIDGING IN WOOD-I-JOIST FLOORS

The use of cross bridging in improving performance and load-carrying capacities of conventional sawn lumber joist floors is well known. With the rapid substitution of solid sawn joists by prefabricated wood I-joists and the tendency of builders to adopt conventional construction techniques for this relatively new product, there is need to evaluate if the same type of bridging can be used equally effectively for floors built with wood I-joists. This study was conducted to answer this question.

A total of eight full-size floor systems were tested in this study for their deflection and vibrational characteristics. In addition, four narrow floor specimens were tested to evaluate the impact of omitted bridging members on failure load and mode of floors. These test systems were built with 302mm (11 7/8") deep wood I-joists and an oriented strandboard floor sheathing. Construction details followed largely National Building Code requirements. In addition to the major objective of finding out if cross bridging can be similarly adopted for floors with wood I-joists, the experimental program was designed to evaluate the influence of parameters on the effectiveness of cross bridging. These parameters included joist spacing, number of rows of bridging and lumber strapping.

It was found that deflection and vibration levels decreased with the addition of bridging. Bridging was more effective in floors with close joist spacing than wide joist spacing. Increasing the number of rows of bridging from one to two (equally spaced) led to a large reduction in floor deflection but only a relatively small reduction in vibration levels. A large synergistic influence was achieved when a bottom lumber strapping was used in conjunction with cross bridging. This effect was particularly profound for systems with wide joist spacing. The current requirement of using two 57 mm (2 1/4,") nails at each end of a cross bridging member was found to be adequate if properly installed. Any weak fastening or omitted bridging member may lead to a large reduction in load-carrying capacities of floors, compared with properly fastened systems. The use of bottom strapping in conjunction with cross bridging, can however minimize this reduction.

Prepared by Y.H. Chui, Wood Science and Technology Centre, University of New Brunswick. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

HOUSE CONSTRUCTION INDUSTRY

TECHNOLOGY DISSEMINATION - A NEW APPROACH

Despite significant national efforts, the Canadian residential construction industry is often resistant to the introduction of cost saving technologies, due in part to most contractors having limited abilities to research, evaluate and introduce such advances. The goal of this External Research Program work is to devise an information dissemination technique which focuses on the process of innovation introduction rather than the innovations themselves. It is felt that by "reasonably demonstrating" the value of various innovations to subcontractors, there will subsequently be a "natural" spread to other projects as the subcontractors utilize their newly acquired cost-effective techniques to gain a competitive advantage. This project report will be of interest to researchers, builders and developers who desire to integrate new and improved building process onto the mainstream of the construction industry.

CMHC Project Officer : *Thomas Green*	***CIDN*** : 2144 0200016
Division : Research Division	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	

HOUSING DESIGN

FLEXHOUSING DESIGN DEMONSTRATION

CMHC's FlexHousing is a new and innovative approach to home design, renovation and construction, able to adapt and convert affordably as people's lifestyles change. This exciting and practical approach to designing and building housing of all kinds - from single family, duplexes, multi-unit and even apartments allows residents to convert space to meet their changing needs. A 1996 CMHC design competition has spawned open houses of the winning designs and publications.

The Canadian Centre for Housing Technology at the National Research Council features the winning FlexHouse design in its Information Centre, opened in October 1999. More information is available on the CMHC Home page or in the new publication "FlexHousing - Homes That Adapt to Life's Changes." FlexHousing demonstrations have also taken place in Edmonton (Oct.1998) and St Nicolas - near Quebec City - (May 2000); and in Vancouver at BCIT "Home 2000" (June 2000).

CMHC Project Officer : *Tom Parker*	***CIDN*** : 1389 0300
Division : Research Division	***STATUS*** : Ongoing Project

FLEXHOUSING: HOMES THAT ADAPT TO LIFE'S CHANGES

FlexHousing in CMHC's answer to housing design that meets the changing needs of the occupant. This publication explains the key principles of FlexHousing essentially housing design that is adaptable, accessible and affordable.

This is a visually dynamic and attractive publication that features winning designs from CMHC's FlexHousing competition as well as examples of adaptable housing from around the world. The publication also includes information on FlexHousing systems and materials, costs and checklists. Sample floor plans are provided for many housing types including: singles, duplexes and multi-units.

This publication is suitable for consumers who are making a housing purchase decision as well as housing design and construction professionals.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 72 pages.

Order number: NE2020 **Price: $9.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Bâti-flex: Un chez-soi adaptable.*

STATUS : Completed Report
AVAILABILITY : CMHC Information Products
700 Montreal Road, Suite 1000, Ottawa, Ontario, K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

MONTRÉAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING

This project aims to highlight the adaptation processes of housing and building types throughout the various phases of the evolution of "plex" formulas (duplex, triplex, fourplex, fiveplex ...) in Montreal over four construction cycles between 1866 and 1935.

CMHC Project Officer : *Mark Holzman*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1455 0200001
STATUS : Ongoing Project

PASSIVE SOLAR HOUSE DESIGN PILOT WORKSHOP

In partnership with the Solar Energy Society of Canada (SESCI), this project will develop and present a pilot workshop on passive solar house design in 2000. The content of the workshop will be based primarily on the CMHC TAP the SUN publication. The pilot workshop will provide experience and feedback for the possible future development of a series of passive solar design workshops for presentation across Canada. The workshop is targeted to designers, builders and developers who want to include renewable energy approaches in their housing projects to create more energy efficient housing, more comfortable interior spaces, and reduce green house gas production from the housing sector.

CMHC Project Officer : *Thomas Green*

CIDN : 2200 0200002

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication will not be published

PLEX HOUSING: A RENEWED TRADITION

This External Research Program report focuses on the Plex as an affordable and sustainable housing form. It traces its evolution and documents several historical types of it. The report appraises the Plex's advantages and proposes several design alternatives that would adapt it to the needs of contemporary households. The adapted Plex emerges as a flexible and economic form of housing most suitable for meeting the need for affordable housing. It is also an ideal form for infill and for more compact new neighbourhoods.

Original version prepared in French by Richard de la Riva, Suzanne Gagnon and Gavin Affleck. Translated by the CMHC. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

Note : Aussi disponible en français sous le titre : *Les "plex" : une tradition renouvelée.*

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

SINGLE ROOM OCCUPANCY HOUSING DESIGN STUDY AND CHARETTE

The City of Toronto and the Canada Mortgage and Housing Corporation (CMHC) jointly sponsored a three-phase research and design study on single room occupancy (SRO) housing for low-income singles. The three phases included:

1) a review of existing precedents, and code and by-law restrictions 2) the organization of a design charette, and 3) the preparation and financial analysis of design prototypes and a final report synthesizing all previous work.

This report represents the culmination of this research and design process. As such, it synthesizes the key findings of the first two phases of this study process, at the same time that it presents and costs several design prototypes.

Prepared by Planning Alliance. Prepared for the City of Toronto and the Canada Mortgage and Housing Corporation. CMHC Project Officer: Anna Lenk. Toronto: Planning Alliance, 2000.

STATUS : New Completed Report

AVAILABILITY : Available only on a loan basis from:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

UNIVERSAL DESIGN WITHIN THE HOME BUILDING INDUSTRY

Universal design refers to design solutions that respond to the range of the population to the greatest extent possible. It is a new way to think through the design of environments and products to ensure usability. It accepts that people are not "norms" but rather individuals with differing abilities, strengths, shapes, etc. Universal design is a global, all-encompassing effort to remove any and all barriers from the environment and to create accessible, comfortable, responsive spaces for the most extensive population possible.

This project focused on how universal design is perceived and how changes occur in the housing industry. The questions addressed in this research were:- What is known about universal design and its principles in the housing industry?- What are the influences that effect change in marketing and conventional construction in the housing industry?- What are the factors involved in the development and distribution of effective informational materials?

The results of the research indicated:- A lack of information and confusion about the term "universal design" in the industry and by consumers- While the housing needs of people with disabilities were considered, human functioning issues were not- There is a desire for more information on human functioning and the principles of universal design- Informational materials should be both interactive and print; be focused on the industry and be sent directly to individual members of the industry.

Recommendations from the report include the following:- The term universal design should become the recognized term in describing inclusive construction and buildings.- The inherent value free terminology of universal design be used in marketing and education.- A common terminology would be useful to both the industry and consumers.- Focused education to improve knowledge about universal design and its benefits is needed within the home building industry and information prepared must include details on human functioning and principles of universal design.- Interactive workshops, lectures, and demonstration projects are important to disseminate information within the industry.

Prepared by Gail Finkel with Yhetta Gold, George Fraser, and Ron Hambley. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

INDOOR ENVIRONMENT

ACHIEVING HEALTHY INDOOR ENVIRONMENTS: A REVIEW OF CANADIAN OPTIONS

CMHC participated in this partnership initiative developed and led by Pollution Probe. The objective of this project was to establish the current state of regulation of the indoor environment - residential, commercial and institutional - in Canada and to identify barriers and approaches to enabling the promotion and achievement of healthy indoor environments. The project reviewed and analysed existing regulatory and voluntary programs which have an impact on the indoor environment, both in Canada and internationally. The project scope covered four distinct areas - buildings, products, services and processes, and identified barriers to the creation of healthier indoor environments, gaps in present knowledge, and opportunities for voluntary initiatives. Through consultation with industry, government and other key stakeholders, the most instructive initiatives were evaluated to identify key success factors and for their potential as voluntary initiatives which can compliment and/or supplement existing regulatory measures.

Prepared by Ian Morton of Pollution Probe and Jay Kassirer of Cullbridge Marketing and Communications. CMHC Project Officer: Thomas Green. Toronto: Pollution Probe, 2000.

STATUS : New Completed Report

AVAILABILITY : Pollution Probe Foundation
625 Church Street
Toronto, Ontario
M4Y 2E8

DEFINING THE CONVECTIVE DRIVING FORCE FOR SOIL GAS INTRUSION INTO HOUSES

This External Research study is an evaluation of soil gas pressures surrounding building envelopes, taking into account the role of geologic variability, surface coverings, and other environmental factors. The data from this study will be used to predict soil gas flux into houses and assess its impact to indoor air quality.

CMHC Project Officer : *Don Fugler*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1826 0200001
STATUS : Ongoing Project

DEVELOPMENT OF A TEACHING MODULE ON INDOOR AIR QUALITY FOR PHYSICIANS

The Ontario College of Family Physicians, in collaboration with and funding from CMHC, is developing a teaching module on Indoor Air Quality which will form part of the curriculum in Environmental Health in Family Medicine. Dr. Alan Abelsohn, the project leader, tested the module at a peer workshop for family physicians in Ontario in March, 2000. The participants of this workshop will be delivering the module in their respective communities. Plans are underway to present the module at the teaching universities in Ontario. Distribution of the module in other provinces will also be explored. This project is an attempt to transfer housing information to consumers through health professionals. Physicians are in a unique position and authority and are the most suitable for communicating housing information and the health impacts of good indoor air quality.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2128 0200001
STATUS : Ongoing Project

EFFECT OF IMPROVING THE HOME ENVIRONMENT ON ASTHMA: A PILOT STUDY

Six houses having one or more individuals suffering from asthma and in which the occupant's symptoms are linked to the house were inspected following the CMHC Residential IAQ Investigation Protocol. All houses were found to be severely moldy. The houses were subjected to tests for various indoor air parameters - CO2, VOC's, dust mite allergens and molds. Mold tests confirmed the inspection findings. Five of the homeowners proceeded with a remediation. Compliance with recommendations of the study varied from partial to full. The health status of the asthmatic occupants was monitored during the study. Health improvement of the occupants correlated qualitatively with the degree of improvement of the air quality of the houses.

Prepared by Buchan, Lawton, Parent Ltd. CMHC Project Officer : Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 1998, c1999. (Housing Technology Series)

Order number: PE0362

NOTE : Aussi disponible en français sous le titre : *Effet sur l'asthme d'une amélioration du milieu intérieur résidentiel : étude pilote.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

FIELD VALIDATION OF AN IAQ MODEL FOR PREDICTING THE IMPACT OF MATERIAL EMISSIONS ON THE INDOOR AIR QUALITY OF A NEWLY CONSTRUCTED HOUSE

Jointly with CMHC and Natural Resources Canada, the National Research Council's Institute for Research in Construction conducted measurements of indoor air parameters at the Canadian Centre for Housing Technology (CCHT) 'reference' house, a newly constructed house at the NRC campus. The construction of this house is typical of currently built houses. The concentrations of thirteen selected volatile organic compounds (VOC's) as well as formaldehyde, CO2, ozone, air change rate, temperature and relative humidity were monitored over a nine month period. These data will be compared with the predictions of a model developed to predict the impact of emissions of building materials on the indoor air quality of a newly constructed house.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2110 0200001
STATUS : Ongoing Project

GUIDE TO MECHANICAL EQUIPMENT FOR HEALTHY INDOOR ENVIRONMENTS

This publication summarizes current information on heating (both space and hot water heating), cooling and ventilation systems and equipment used in low-rise, residential buildings with regards to their effect on indoor air quality. An additional discussion of water purification systems is also presented. The publication is intended to be an information source primarily for environmentally hypersensitive individuals and, second, for the general public and the home-building industry as a reference on mechanical systems.

The document provides background information for the reader by presenting definitions of specialized terminology used in the publication and with a discussion of a house as a system. This latter discussion shows how the operation of mechanical equipment and the indoor air quality in a home are affected by other elements such as insulation, air barriers and the types of interior finishes used.

Various types of heating, cooling, ventilation and air filtration systems are presented with a discussion of how they affect the indoor air quality of a home. Retrofitting existing heating systems to improve the indoor air quality is also addressed. A discussion focused on the specific needs of the environmentally hypersensitive is presented at the end of each section.

This report concludes with a section on water quality and the types of water treatment systems available for residential applications. The appendices contain lists of suppliers of heating, cooling, ventilation and water treatment equipment indexed both by type of equipment and by supplier.

Prepared by David Rousseau, Dara Bowser and Chris Mattock. CMHC Project Manager: Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Healthy Housing and Communities Series Research Report) 140 pages

Order number: PE0372

NOTE : Aussi disponible en français sous le titre : *Guide d'équipement mécanique pour un environnement intérieur sain.*

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
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HEALTHY INDOOR ENVIRONMENTS PHASE 2: CONSULTATION PROCESS

This is the second phase of the project "Towards the Use of Voluntary Initiatives for Achieving Healthy Indoor Environments in Canada" which was a partnership project led by Pollution Probe Foundation in which CMHC participated in 1998-99. Recommendations from the initial report include the development of a comprehensive multi-stakeholder strategy to address the Canadian indoor environment issue. This Phase 2 work, led by Pollution Probe in partnership with a number of government and industry stakeholders, involves regional consultations and a database discussion forum. The objective of phase 2 will be to develop a vision of what is possible in the field of healthy indoor environments, a strategy to achieve it, and multi-stakeholder commitment to realise that strategy. A final report for Phase 2 work is expected by spring 2001.

CMHC Project Officer : *Thomas Green*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
NEW

INDOOR AIR POLLUTION FROM ATTACHED GARAGES

CMHC is contributing to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. The current work includes modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. So far, modeling has not been very successful. Further field testing took place in the winter of 1998/99. Health Canada will be publishing the project reports.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1910 0200002
STATUS : Ongoing Project

INDOOR AIR QUALITY TRAINING IN FIRST NATIONS COMMUNITIES

The objective of this project is to provide First Nations people with the capability to deal with mold and other indoor air quality problems in their communities. Working with First Nations, CMHC's existing training initiatives have been modified for First Nations use. An Advisory Group consisting of First Nations technical and health representatives was formed to advise CMHC on the delivery and implementation of the training. The Advisory Group meets or communicates on a regular basis to discuss modifications of the training programs, scheduling and delivery of courses as well as issues dealing with funding.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 2208 0200001
STATUS : Ongoing Project

INDOOR AIR QUALITY TRAINING PROGRAM

CMHC's Residential Indoor Air Quality IAQ) Investigator Program exists to train qualified individuals to investigate homes for indoor air problems. Individuals who complete the program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. They offer their professional services to the public for a fee. Individuals interested in the program can contact the program coordinator (e-mail: joolsdev@mv.igs.net, telephone 613 756-0714) for admission requirements and application forms. The program will continue in year 2000. Ninety five individuals from six regions have participated in the training since 1998. For referral purposes, a list of individuals who have completed or are completing the training is available from CMHC offices.

CMHC Project Officer : *Virginia Salares*

CIDN : 1623 0300017

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

INVESTIGATION OF BLACK SOOT STAINING IN HOUSES

This study was designed to investigate sooting problems in houses where occupants reported regular burning of candles. Samples of stained carpets, filters and other materials as well as swab samples of black dust or soot were taken from five homes. In addition, samples of commonly burned candles in the homes were burned in a laboratory. The objective was to try and match the soot from the candles burned in the laboratory to the materials found to be staining components in the houses. Various laboratory techniques were used to try and establish a practical, cost effective test protocol for identifying soot. In addition, a thorough indoor air quality audit was conducted on each home to identify other potential pollutant sources and contributing factors. This information could provide IAQ investigators with diagnostic and testing techniques that would help them corroborate or prove to clients the pollutant source of the streaks and stains in their homes. The study also included a search of industry information to uncover best practices for clean up and control of soot staining problems.

Prepared by Gord Cooke, Air Solutions Inc. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

LET'S CLEAR THE AIR SEMINAR AND THE THREE-DAY RESIDENTIAL IAQ INVESTIGATOR COURSE

In consultation with First Nations, the content and materials for the Let's Clear the Air seminar and the three-day Residential IAQ Investigator course have been reviewed in terms of these materials' appropriateness and sensitivity to First Nations needs and culture. The courses have been piloted to selected technical providers, some of whom are expected to become First Nations presenters upon completion of their training.

CMHC Project Officer : *Virginia Salares* **CIDN** : 2208 0200003
Division : Research Division ***STATUS*** : Completed
AVAILABILITY : Publication will not be published

PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES

This joint study between CMHC, Carleton University, Health Canada and others will ultimately look at several hundred homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. The field tests for the third year of the study have been completed. Funding for the coming winter test season is in place, and an additional 60 houses should be tested in the 4th year of the project.

CMHC Project Officer : *Ken Ruest* ***CIDN*** : 1618 0300001- 2
Division : Research Division ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available

RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health in renovated housing. Health Canada, Carleton University and Natural Resources Canada are partners and will be represented in the project advisory board. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study should be complete by late 2001.

CMHC Project Officer : *Virginia Salares* ***CIDN*** : 2157 0200001
Division : Research Division ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available ***NEW***

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by industry, Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is currently being planned.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS **:** Planned

STUDY OF HOUSE RETURN AIR SYSTEMS USING FLOOR JOIST SPACES

Research was conducted on air in houses that is distributed through the ducting system consisting of supply ducts and a return air plenum. Floor joist spaces are being used as return plenums in new construction and this study characterizes the indoor air in a number of houses with return air plenums made of all metal, combinations of metal, solid wood, plywood or oriented strand board. A Research Highlight will be available in 2000.

CMHC Project Officer : *Virginia Salares*
CIDN **:** 1704 0300001
Division : Research Division
STATUS **:** Ongoing Project
AVAILABILITY : Publication will not be published

LIGHTING

ASSESSING THE ADEQUACY OF RESIDENTIAL LIGHTING IN TWO CARE CENTRES FOR PERSONS WITH ALZHEIMER'S DISEASE: USING THE NEW AGE-ADJUSTED NORTH AMERICAN ILLUMINATION STANDARDS: RECOMMENDATIONS

This study extends current knowledge on the design of residential settings for elderly persons by comparing and assessing the suitability of lighting levels in two nearly identical sites for persons with Alzheimer's disease in Edmonton, Alberta. In addition to the centres' lighting levels being contrasted, they were also compared with the new age-adjusted lighting recommendations of the Illuminating Engineering Society of America IESNA Goals included determining the effectiveness of the lighting design differences at McConnell Place West (MPW), where lighting was enhanced compared to McConnell Place North (MPN), and to determine if any behavioural differences in the two settings might be attributed to lighting levels. The physical attributes of the two centres (such as differences in colour of walls and floors, etc.) were fully described to investigate how much of the variance between the two centres was attributable to natural daylighting through windows, rather than to light intensity and known characteristics of the artificial illumination. Staff members and family members were asked if they were satisfied with lighting levels, and in addition, residents' utilization of public areas in MPW and MPN was determined through systematic direct observation.

LIGHTING

Objective measurement indicated the MPW met the IESNA recommendations in most respects, whereas MPN did not. In many areas, MPW had more than four times the lighting levels found in parallel areas of MPN. Whereas the enhanced lighting in MPW did not dramatically influence the location of resident programs, staff satisfaction with lighting for various activities was in most respects significantly higher at the centre with enhanced lighting. Family members liked the residential-style lighting in both sites. Results indicated that design professionals should consider more carefully the function of each space in order to ensure that appropriate lighting is available for each function. Problems with strong direct sunlight in one centre suggest they also need to provide strategies for controlling light in rooms that receive substantial amounts of such light.

Principal Investigator: Doris Milke. Team members: Caroline Clark and Monica Bucknell. CMHC Project Officer: Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
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MANUFACTURED HOUSING

LAND USE ISSUES IMPEDING THE PROVISION OF AFFORDABLE HOUSING WITH MOBILE HOMES

The study will summarize the manufactured (mobile) home legislative environment across the U.S. and Canada, identify legislative and land use impediments blocking improved market share on the part of the Canadian industry, analyze the relevance of the pro-active U.S legislative environment as a paradigm for Canadian legislative reform and develop suggestions for manufactured home land use and legislative development in Canada.

CMHC Project Officer : Doug Pollard
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2154 0200001
STATUS : Ongoing Project

MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM

The objective of this partnership project with the Canadian Manufactured Housing Institute was to develop and pilot a training program for retailers in the manufactured housing industry. This training program provides retailers with the skills, tools and knowledge on the technical, financial, regulatory and other aspects of their industry to better serve their clients effectively and professionally. CMHI was responsible for overseeing the development and translation of the training material and delivery of the two-day pilot workshop session. For more information on this program, please contact Cliff Youdale from CMHI at (613) 563-3520.

CMHC Project Officer : *Darrel Smith* **Division :** Research Division

AVAILABILITY : Publication is not available ***STATUS*** : Completed

REVITALIZATION OF THE MANUFACTURED HOUSING INDUSTRY IN CANADA TO PROVIDE AFFORDABLE HOUSING EFFECTIVELY

In Canada, mobile homes are usually built to the CAN/CSA-Z240 MH standard (Z240) rather than to the provincial code, although some provinces require mobile homes to be built to the provincial building code. The National Building Code (NBC) forms the basis for regulating all site-built housing.

In the United States, the mobile home industry operates under the federal Housing and Urban Development (HUD) Code--a performance-based code which appears to produce mobile homes with similar performance characteristics to Canadian manufactured mobile homes. MHI Canada suggested that there may be situations where the NBC and its provincial equivalents or the Z240 standard have more stringent requirements than are required for occupant health and safety. MHI Canada also believes that there may be other approaches to manufactured housing that will deliver equivalent housing performance, but at a reduced cost. MHI Canada suggested that an examination of the Canadian and U.S. manufactured home industries (with a focus on mobile homes) experience might identify instances where the standards/codes/ materials/procedures, etc. could be modified to improve housing affordability in Canada.

Because of the above scenario, Canada Mortgage and Housing Corporation (CMHC) designed and approved a project to investigate the situation. MHI Canada, the Canadian Manufactured Housing Institute (CMHI), the National Research Council (NRC), Industry Canada and building officials from Alberta, Ontario and Quebec were involved in the advisory committee for the project.

The project began in late 1997 with visits to 11 different Canadian plants (from British Columbia to the Maritime provinces) and one U.S. plant. People familiar with the U.S. market were interviewed. A number of appropriate reports were reviewed during the project. Two project preliminary reports (collections of working papers) were prepared and submitted to the advisory committee. In June 1998, the second preliminary report served as a basis for three round table sessions with the CSA, manufacturers and other parties with a specific interest in the subject matter.

This report is the official record of the project. The report analyzes relative market penetration of manufactured homes between the U.S and Canada and explores the issues which currently impede Canadian market success. Issues explored include construction cost details and general affordability, regulatory frameworks and barriers, distribution systems and regional differences. The report provides a two year plan of action to rebuild the Manufactured Housing Industry especially in relation to the revitalization of its construction standards.

Prepared by L. J. O'Riley & Associates Inc. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Doug Pollard. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report) 42 pages.

Order number: PE0338

NOTE : Aussi disponible en français sous le titre : *Revitalisation de l'industrie des maisons usinées au Canada pour la fourniture efficace de logements abordables*

STATUS : Completed Report

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** SEE ALSO: *Earthquake Resistant Modular Home Foundation System*, p. 183
Export Performance and Needs of the Canadian Manufactured Housing Industry, p. 185
Study of Factory-Built Housing Market Opportunities in Southeastern U.S.A., p. 195

DETERMINATION OF WATER VAPOUR DIFFUSION ACROSS BRICK MASONRY TREATED WITH WATER REPELLENT SEALERS

The ability for water repellents to allow for water vapour diffusion across treated masonry is an important criteria in the selection of a water repellent. Unfortunately, there appears to be a lack of a standard test procedure to determine the rate of water vapour diffusion across composite materials such as brick masonry assemblies. Wet cup and dry cup methods are often used in the industry to determine vapour diffusion rates, however, these procedures were designed to test uniform sheet materials and are not suitable for composite materials such as brick masonry assemblies.

Consequently, a unique experimental test method was developed for the purpose of evaluating the water diffusion characteristics of six brick masonry panels of which five were treated with a water repellent product. The sixth panel was left untreated to serve as the control sample. The results have indicated that the application of five commercially available water repellent products, specifically designed for use on masonry, had no significant impact on the vapour diffusion characteristics of a masonry wall assembly, in comparison to the control sample.

With regards to long term performance, the panel assemblies were moved to an exterior location for weathering at the completion of initial tests. Following exposure to the elements for a period of approximately one year, the panels will be returned to the laboratory for retesting. The findings of these experiments will be the subject of a future report.

Water vapour transmission or "breathability" and resistance to water penetration performance are both important criteria in the selection of a water repellent for a masonry substrate. The issue of water repellency was the focus of an earlier CMHC study summarized by the report entitled "Performance Evaluation of Water Repellents for Above Grade Masonry"; dated May 15, 1997.

Prepared by Antonio Renzullo, Mario Gonçalves and Armand Patenaude. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 2000. (External Research Program)

STATUS : New Completed Report

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EFFECTIVENESS OF VARIOUS BASEMENT TREATMENTS AND RENOVATIONS TO SOLVE IDENTIFIED BASEMENT MOISTURE PROBLEMS

This project deals with the effectiveness of various basement treatments and renovations to solve identified moisture problems. The houses have been selected and tested, and renovation work has been undertaken. Testing in spring 2000 evaluated how the remediated basements now deal with water and airborne humidity. The results will be presented a series of case studies. This report is being prepared.

CMHC Project Officer : *Don Fugler*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2065 0200002

STATUS : Ongoing Project

GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS

CMHC is providing financial and technical support to NRC/IRC to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America.

CMHC Project Officer : *Silvio Plescia*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2199 0200001

STATUS : Ongoing Project

MEASUREMENT OF THE HYGROTHERMAL PROPERTIES OF PLASTER AND STUCCO FOR STRAWBALE BUILDINGS

This project deals with lab testing to characterize the moisture performance of plaster and stucco over straw bales. Seventeen samples of interior or exterior wall coatings underwent permeability testing and moisture absorption tests. The results with a siloxane coatings look promising as the stucco remains permeable to vapour but showed good resistance to wetting. The information will be of use to straw bale builders, designers, and code officials. A Research Highlight has been prepared and will be released shortly.

CMHC Project Officer : *Don Fugler*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1867 0300007

STATUS : Ongoing Project

MOLD CLEANUP PROCEDURES: CONTRACTORS' GUIDE

A draft document for professionals on Mold Cleanup Procedures has been produced but not released by CMHC. The focus of the document is on information required by contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the current draft of the document and its mold cleanup procedures are now being revised to incorporate more current and substantive information from authoritative sources. This document will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation. A significant change in approach since preparation of the original draft is the expert consensus that mold remediation should be approached from the perspective of the size of visible mold area rather than the type or toxicity of the molds present. The revised document should be released by May 2001.

CMHC Project Officer : *Ken Ruest*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project
NEW

MONITORING OF MOISTURE CONTENT OF STRAW BALE HOUSE WALLS AT THE EXTERIOR STUCCO

Approximately twenty houses in Alberta and British Columbia have been instrumented with moisture sensors under the stucco of the exterior walls to examine the effect of rain penetration into straw bale walls. A related project is examining the use of straw bale as floor insulation in houses. The results of the floor project show that, without perfect drainage, the bales will get wet and rot will set in. A single copy of the straw bale floor report has been sent to the Canadian Housing Information Centre. Results of the straw bale monitoring will be produced as a Research Highlight.

CMHC Project Officer : *Don Fugler*
CIDN : 1867 0300006
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

PERFORMANCE EVALUATION OF WATER REPELLENTS FOR ABOVE GRADE MASONRY

Water penetration across brick masonry exterior walls is a problem which building owners and construction professionals must deal with frequently. Water repellents are often used in an attempt to resolve water penetration problems in certain remedial applications.

The objective of this project was to evaluate the performance of various water repellents for above grade masonry on a comparative basis and develop practical methods to evaluate their effectiveness. This evaluation was based on lab analysis and field testing as well as a literature review to find available information on water repellent performance.

The results of the study have indicated reductions in water penetration in the order of 34% to 99% upon application of commercially available masonry coatings. The data accumulated during this study also revealed a trend indicating an increase in the rate of water penetration from the time of product application (i.e.; reduced repellency), necessitating product reapplication after a given time interval.

Prepared by Domenic Chiovitti, Mario Gonçalves, Antonio Renzullo. CMHC Project Officer: Jacques Rousseau. Ottawa: Canada Mortgage and Housing Corporation, 1997 (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
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RE-INSULATION OF EXISTING FLAT-ROOF MULTI-FAMILY BUILDINGS IN QUÉBEC

A joint project with Hydro Québec to examine ways of re-insulating low-rise multi-family buildings for energy efficiency, without causing moisture problems in the attic. Field testing was complete in early summer 1997. A final report was prepared. Hydro Quebec has not yet released it to the public.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 1377 0801001
Division : Research Division — ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available

RESIDENTIAL DEHUMIDIFICATION STATE-OF-THE-ART

This research investigated the current state of residential dehumidification, including technologies, costs and benefits, and provided recommendations for best dehumidification practices in housing. Dehumidifiers can consume high amounts of energy during their use and will create significant heat as well, a drawback during the cooling season. The information has been assembled in an About Your House publication which provides advice to consumers on the selection of mechanical dehumidifiers. This About Your House publication will be available in early Fall 2000.

CMHC Project Officer : *Don Fugler* — **Division :** Research Division
AVAILABILITY : Publication is not available — ***STATUS*** : Ongoing Project

STUDY OF RECURRING MOLD PROBLEMS ON THE ROSEAU RESERVE IN MANITOBA: PHASE TWO

The first phase of the project dealt with an investigation of eight houses on the Roseau River Reserve. Some of these houses had been remediated following the flood in 1997. Moisture problems were of a chronic nature, not directly related to flooding. Remediation and clean-up was found to be ineffective. This report is available.

The second phase of the project consists of developing an information kit for First Nations. The kit will assist First Nations to recognize when there is a mold problem and to take the necessary steps to deal with the problem. The report will be available in fall, 2000.

CMHC Project Officer : *Virginia Salares*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2036 0200001

STATUS : Ongoing Project

WALL MOISTURE PROBLEMS IN ALBERTA DWELLINGS

In partnership with the Alberta Housing Industry Technical Committee, this project investigated the problem of moisture ingress into low-rise wood frame housing in Alberta. A total of 50 buildings were evaluated for potential causes of moisture leakage problems. Some of the buildings in the study were under construction at the time of the investigation. This provided some insight into current building practices without having to open existing building walls. Few of the reported water leakage problems could be attributed to interstitial condensation, but the majority of cases were due to water infiltration from the exterior during wet weather conditions. The report from this project proposes various changes to current building practices to resolve these problems.

Prepared by Building Envelope Engineering Inc., Anton J. Vlooswyk, John A. Vlooswyk, James B. Posey. Prepared by Canada Mortgage and Housing Corporation and Alberta Housing Industry Technical Committee. CMHC Project Officer: Ken Ruest. Ottawa: CMHC, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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➡ SEE ALSO: *BC Moisture Problems*, p. 58
Drying of Walls with Ventilated Stucco Cladding, p. 64
Remediation of Moisture Troubled Wood Framed Buildings in the Coastal Climate of B.C., p. 75
Stucco-Clad Wall Drying Experiment, p. 78

ABOUT YOUR HOUSE: ON-SITE WASTEWATER RECYCLING SYSTEMS FOR THE NORTH

The purpose of this project is to write an 'About Your House' document on on-site wastewater recycling systems for the North.

CMHC Project Officer : *Don Fugler*
CIDN : 1415 0300002
Division : Research Division
STATUS : Planned
AVAILABILITY : Publication is not available
NEW

ABOUT YOUR HOUSE: SIMPLE COGENERATION IN THE NORTH: FOUNDATIONS FOR THE NORTH- NE3 - NE4

The purpose of this project is to draft About Your House (North) series documents on the topics: Simple Cogeneration in the North and Foundations for the North.

CMHC Project Officer : *Don Fugler*
CIDN : 1415 0300003
Division : Research Division
STATUS : Planned
AVAILABILITY : Publication is not available
NEW

COMPARISON OF NORTHERN HOUSING COSTS

This research will isolate all hard and soft housing components and their respective costs in a number of Northern communities to find out specifically what makes Northern housing so expensive. The component costs will be assessed on both an immediate financial outlay as well as life cycle performance costs. A more subjective analysis will examine these results and see where use of local labour, indigenous materials and value-added processing of raw, local materials can be developed or expanded to reduce housing costs. This is mandatory base-line research which has not been done. Until the sources of skewed costs are isolated, housing stakeholders in the North cannot not know what may be appropriate, needed or affordable options to address northern costs.

CMHC Project Officer : *Aleta Fowler*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Planned
NEW

FOUNDATION SYSTEMS FOR USE IN PERMAFROST AREAS

This project is a study on foundation systems for use in Northern permafrost and intermittent permafrost areas. The study assembled, documented and analyzed all data possible from literature searches and from the field on all known foundation systems used in the north. The final report includes a decision making tree to enable communities, homeowners, builders and renovators to make informed and appropriate choices in foundation systems. The final report is expected to be available soon.

CMHC Project Officer : *Aleta Fowler*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project

INNOVATIVE FOUNDATIONS, HEATING & VENTILATION

This R&D&C (research, development, commercialization) project and first stage monitoring is complete and a report due before the end of 1998. CMHC, Yukon Housing Corporation (YHC) and Yukon Energy partnered in building two research/demonstration houses in Dawson City, Yukon. This work is a continuation of previous successes in R&D&C of the space frame foundation technology now being exported to Alaska. The thrust of the current foundation work is to reduce cost, develop a technology that can be locally manufactured and reduce the height of the crawl space.

A torque tube HSS steel section is under one house. The other house will be an extension of the sheet metal reinforced plywood monocoque technology resting on three bearing points. Lots of ground movement has been reported so the test site is proving to be a good demonstration. After a review of northern and remote technology, the heating and ventilation systems incorporate and optimize energy efficiency, minimal equipment and sustainable ventilation operation. Construction is complete and the houses are occupied. Commissioning of the project was a large task and the systems appear to be running efficiently at about half the energy consumption of a typical northern house. The mechanical technology was used on another YHC project at substantial capital savings and with some modifications appears to be the technology of choice. Work is underway to develop a more cost effective and simple foundation system.

CMHC Project Officer : *Mark Holzman*
CIDN : 1676 0300001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

NORTH WEB-SITE

The purpose of this partnership project was to design, establish and maintain a dedicated NoRTH Web-Site for a two year period. The project partners are CMHC, Alaska Housing and Finance Corporation, and Yukon College. The web-site includes relevant technical information such as factsheets of research reports and the Frostline newsletter. It also includes discussion groups to provide a means of ongoing and current communication. The web-site has links to other relevant web-sites and can be visited at www.NoRTH-RTHN.org. A current site renovation will enable it to become self-supporting. This project will retain a person to post the backlog of articles, to recruit new material needed by Northern audiences, implement the planned next steps such as negotiating links to critical sites, creating a chat room format, etc.

CMHC Project Officer : *Aleta Fowler*

CIDN : 1886 0200001

Division : Research Division

***STATUS* :** Ongoing Project

AVAILABILITY : Publication will not be published

NORTHERN HEALTHY HOUSE DEMONSTRATION

The North has proven itself receptive to Healthy House components as demonstrated by the success of the adoption of microsystems in numerous communities. The North is at a critical juncture with many regions finalizing Land Claims. This represents a major influx of capital into Regions. These same Regions are struggling with primary housing and infrastructure issues and need to make key decisions about these almost immediately. Yet, without a model, there is reluctance to adopt another "southern" model not proven in the North. A demonstration Healthy House is being planned. This would allow interested parties to view the performance and use of components, permit informed choices as to what their application might be elsewhere in the North, nationally and internationally, and encourage more widespread adoption of Healthy House and "better" housing and community models.

CMHC Project Officer : *Aleta Fowler*

Division : Research Division

AVAILABILITY : Publication is not available

***STATUS* :** Planned

NEW

** SEE ALSO: *Alternative Home Energy Sources for the North, p. 31*
Soil and Flora Restoration After Ground Disturbance, p. 129

MULTI-UNIT RESIDENTIAL BUILDING MANAGEMENT AND THE ISO 14001 STANDARD FOR ENVIRONMENTAL MANAGEMENT SYSTEMS

The report highlights how the international standard for environmental management systems may be applied to the residential property management industry. The report examines both current residential building management practices and the ISO 14001 standard, in effort to find out whether the standard is of value to the industry and presents a preliminary investigation of how it could be implemented.

The report provides background information on various building management scenarios, and key players in the industry. It includes both non-profit and for-profit multi-unit residential buildings, including housing co-operatives and condominiums. Currently available building management resources, including books and computer software, are listed in the report, along with related associations. The report also provides a brief examination of legislation and regulations related to residential property management and the environment.

In order to acquaint the reader with ISO 14001, the report briefly documents the history of the standard, along with a brief description of its major principles and elements. The benefits of the standard are presented, along with a look at its overall level of acceptance, in both Canada and on the international scene.

The main research method for the CMHC report included a survey conducted through a series of interviews with people directly involved in managing residential apartment buildings, condominium complexes, offices and commercial properties. Other people interviewed include government employees, ISO 14000 experts, product and services suppliers, health and environment experts, and property management association members. The report includes a discussion of the survey results, which also appear in the appendices in tabular form. Additional information in the report was gathered from a variety of printed and electronic sources, and from members of an advisory board made up from industry representatives.

Recommendations made by the report include the education of the industry through conferences, workshops and association newsletters and government incentives to encourage participation. The report also makes various recommendations for implementation of the standard, and proposes the use of focus groups and pilot projects for further study. A final recommendation is the development of a set of specific guidelines for implementing the standard in residential building management.

This report will be of interest to anyone interested in property management and sustainability. The report provides valuable information for anyone interested in setting up an environmental management system for a multi-unit residential building based on the requirements of the ISO 14001 standard.

PROPERTY MANAGEMENT

Prepared by Vince Catalli, Kathleen Dorner, Environmental Management Institute. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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RENOVATION AND INSPECTION

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS - STEERING COMMITTEE FOR NATIONAL OCCUPATIONAL STANDARDS

The purpose of this first phase of this multiphase project is to develop national occupational standards for the private home inspection and municipal building code inspection sectors. The project is supported by the industry sectors, Human Resources Development Canada and CMHC. The national occupational standards will focus on common competencies between both sectors as well as recognizing the uniqueness of each sector. A committee consisting of seven members from each of the two sectors plus an independent chair has been formed and they will be operating under the name of Canadian Home Inspectors and Building Officials - Steering Committee for National Occupational Standards. Key stakeholders such as CMHC, HRDC, NRC, AFN, CREA, CHBA will be invited to attend the committee meetings. There will be three focus group workshops held this fall to develop the draft standards which will be later validated by the membership at large. The final report , i.e., occupational standards, is anticipated to be completed early in 2001. These standards will then form the basis for the subsequent phases of the project, i.e., used separately by the private inspectors and the building officials to develop nationally recognized certification programs for accreditation of training programs, prior learning assessment and recognition tools, and provide information on the occupations within their industries.

CMHC Project Officer *: Darrel Smith*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1962 0200002

STATUS : Ongoing Project

GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of bungalow-style houses built between 1960-1979. The advice considers occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. The publication will include case studies of common renovations to this style of house. The guide will resemble the initial publication in this series which describes appropriate renovations to 1½ storey houses. A draft has been submitted and is out for review.

CMHC Project Officer : *Don Fugler*

CIDN : 2202 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

HEALTHY HOUSING RENOVATION PLANNER: RENOVATE THE HEALTHY WAY

The "Healthy Housing Renovation Planner" is a step-by-step workbook to planning a healthy renovation.

Chapter One explains the links between your home, your health and the environment. It presents the key principles of Healthy Housing - contributing to occupant health, reducing energy consumption, conserving natural resources, minimizing environmental effects and balancing cost and practicality.

Chapter Two discusses the health effects of indoor air quality, with special attention to environmental hypersensitivities. A Home Health Checklist guides you through your home to help you identify sources of air quality problems - and solutions to them.

Chapter Three discusses the importance of up-front planning, walking you through the things you should think about before you begin your project. It describes the "house as a system", how you can renovate according to Healthy Housing principles and how you can get the most for your renovation dollar. Chapter Three will help you determine whether you have the skills and the time to do the job yourself. If you decide to hire a professional, Chapter Three gives you the information you need to choose the renovator who is best for you. The Chapter also discusses the critical importance of a written contract, insurance, building codes and by-laws and ways to minimize inconvenience while a project is under way.

The rest of the Renovation Planner deals with typical renovations, both large and small. In each chapter, you'll find several steps to help you plan a healthy and affordable project. Each chapter focuses on key issues involved in the renovation project: taking stock of the part of the house to renovate, evaluating options and strategies for making changes, and making a plan.

RENOVATION AND INSPECTION

There are charts and checklists throughout the Renovation Planner so you can record your observations and your choices . Project planning worksheets help you assemble all the parts of the puzzle in one place. Lists of publications provide you with additional information on the subjects discussed.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 320 pages.

Order number: NE2172 **Price: $34.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Rénovation de la maison saine.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

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HOMEOWNERS INSPECTION CHECKLIST

The current CMHC's Homeowner's and Homebuyer's: Inspection Checklist for Maintenance and Repair was updated and completely revised and now includes a Healthy Housing evaluation "tool". It provides homeowners and homebuyers with a pre-purchase or pre-renovation guide for performing an inspection on their house. Physical condition, IAQ, energy and environmental and maintenance and repair information is included in the document. It will enable consumers to make more informed decisions prior to hiring the assistance of a private home inspector should the need arise.

Prepared by Ted Kesik. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Darrel R. Smith. Ottawa: CMHC, 2000. 107 pages.

Order number: 2444E ** Price: $19.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Guide d'inspection pour le propriétaire-occupant*

STATUS : New Completed Report

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PRIORITIZED PRACTICAL APPROACHES FOR ESSENTIAL REMEDIATION, REPAIR AND MAINTENANCE PROJECTS

The purpose of this project will be to identify and prioritize remediation work which must be corrected before undertaking common renovation projects to ensure the proper preservation and state of healthiness of the house. Information will be provided on how to identify the prioritized work, consequences of not doing the work, practical solutions, and benefits. The resulting information will be presented in twelve independent fact sheets and will be useful to homeowners to help them prioritize essential repair work either in isolation or as part of a renovation project. The information could also be used by renovators as a tool to help convince homeowners of other essential repairs which needs to be corrected as part of a renovation project when applicable.

CMHC Project Officer : *Darrel Smith*

CIDN : 2227 0200002

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

RENOVATING DISTINCTIVE HOMES: 1-½ STOREY POST-WAR HOMES

Different types of houses pose different renovation challenges and problems. For the 1- 1/2 storey house, the size, the semi-attic bedroom and the construction methods all pose special problems.

This book gives you the information you need to plan and successfully renovate your 1- 1/2 storey house. It includes:

- technical information about the methods used to build your house, so you and your renovation contractor know what to expect;
- information about problems you can expect renovating a 1- 1/2 storey house;
- information about new housing trends, such as Healthy Housing and FlexHousingTM that you can include in your renovation plans to make your house healthier for the people who live in it and adaptable to their future needs.

Chapter 1 tells you about the construction of your 1 1/2 storey Home. Chapter 2 is about typical problems in older homes -- problems that need attention. Chapter 3 is an overview of renovation and will help you plan your renovation project.

Chapter 4 gives you even more planning help, with worksheets, checklists and a sample renovation contract. Chapter 5 and Chapter 6 have renovation ideas that have worked and construction tips to help you and your contractor. Finally, Chapter 7 tells you where you can find more information about every aspect of renovation.

Prepared by Canada Mortgage and Housing Corporation. Ottawa: CMHC, c2000. iv, 88 pages

Order number: NHA2344 **Price: $14.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *La Maison réinventée : Renovation d'une maison d'après-guerre d'un étage et demi,* LNH2344

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

RENOVATOR TRAINING IN CANADA: AN EVALUATION AND SITUATION REPORT

The purpose of this project was to investigate the current situation with respect to renovation contractor training in Canada. A situation report was produced to determine who else is providing training for the residential construction industry with a focus on the renovator. Other issues related to this include marketing, financing, existing materials, relationship to certification, native initiatives, and options for delivery that reach beyond current CHBA membership, (i.e.: community colleges, private firms, etc.). The format and method of delivery was also researched (i.e.. five day, correspondence, computer-based, etc.). Recommendations presented in the study have been reviewed with industry and options for their implementation are being considered.

STATUS : Completed

AVAILABILITY : Publication will not be published

RENOVATORS AND THE INTERNET: INTERNET USAGE BY RESIDENTIAL RENOVATORS IN CANADA, 1998-2001

The objective of this research was to learn more about how residential renovators use the Internet and to identify the types of information and services on the Internet which would be useful by renovators. Also, the research was to identify the main reasons why renovators are not using the technology.

The findings of the project were that the housing renovation industry in Canada is not using the Internet to its full potential as a business tool. Only a small minority of renovators use the Internet at all and those who do use it only minimally and with very limited effectiveness. The most popular Internet feature used by renovators is e-mail There is a considerable amount of very valuable information available to renovators on the Internet on such topics as construction technology, building products and equipment, weather conditions, business information, etc. The main reason stated by renovators for not using the Internet was that they didn't think they needed it. Encouragement and guidance by industry associations, training/educational facilities, government organizations and on-line renovation magazines will be needed to improve the use of the Internet by renovators, particularly the design and promotion of industry web sites and on-line search techniques.

Prepared by Donald M. Caskie. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2000. 143 pages

STATUS : New Completed Report

AVAILABILITY : On a loan basis only from:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

ACTION PLAN FOR REDUCING GREENHOUSE GASES IN RURAL COMMUNITIES

The purpose of this project is to prepare an integrated planning strategy that would provide guidance for rural municipalities across Canada facing the challenges of developing action plans for achieving Kyoto targets for reducing greenhouse gas (GHG) emissions. A rural Canadian community that will be developing an action plan for reducing GHGs will be selected for study. Funding will be directed to documenting the development of the action plan to ensure that the appropriate actions are considered, implemented, monitored and the results disseminated. The objective is to provide an innovative, comprehensive planning approach for rural communities that integrates transportation planning, land use planning, new housing and retrofits, waste management, economic development and the regulatory environment.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2105 0200001
STATUS : Ongoing Project

CANADIAN HOMES AND CLIMATE CHANGE

The object of this research is to create a guide for consumers on Canadian homes and climate change. The guide, in the form of a questionnaire, will help consumers identify where they can make changes in their activities and households to minimize their greenhouse gas creation. The guide should be short and easy to complete. The CMHC will contribute the Guide as part of the broadly based, national social marketing initiative to reduce climate change. A draft questionnaire has been prepared and published in Alternatives Journal. Versions of this draft will be made for different audiences

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2120 0200001
STATUS : Ongoing Project

CENTRE ISCI: PARTICIPATION AND HOUSING EXHIBIT IN THE MONTREAL INTERACTIVE SCIENCE CENTRE AT THE VIEUX PORT.

CMHC is participating in an Interactive Science Centre (Centre iSci) which will be created as part of the restoration of the Old Port of Montreal and opened in May 2000. The Centre's exposition of the science and technology of twelve industrial sectors exposes the visitor to the concepts, potential and challenges of each sector through highly interactive exhibits, multimedia displays and electronic connections to other national and international resources. Its goal is to foster creative and competent attitudes in the visitors in the realm of science and technology, provide knowledge of natural processes and principles underlying each sector, and present issues of importance to the next generation to improve their ability to seize the opportunities of the future. The theme of CMHC's participation and exhibition in the Habitat sector is Healthy Housing and sustainable design. Links are also made to other represented sectors which have implications for housing such as transportation, communication and medicine.

CMHC Project Officer : *Thomas Green*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 2148 0200001
STATUS : Ongoing Project

CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II

A private and public sector consortium has been established to develop a methodology for assisting industry to better understand, control and reduce the levels of construction, renovation and demolition (CRD) waste. To date, the partners include Department of National Defense, Industry Canada, Canada Mortgage and Housing Corporation, Alberta Environmental Protection, NWT Department of Resources, and PCL Constructors Canada Inc. Phase I was the development of a CRD training course in hard copy. The course provides practical and comprehensive information on resource management issues in the Canadian CRD industry. It is intended for project managers which include, but are not limited to: engineers, architects and CRD contractors. Phase II will consist of an Internet based CRD project management course that will: provide current resource management information and case-specific solutions; contribute to the development of standard managerial practice; promote widespread communication of the best resource recovery techniques, contribute to economic growth and job creation; promote long-term behavioural change; and help industry associations and government departments meet mandated environmental targets. The project is planned for completion by late 2000.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2032 0200001
STATUS : Ongoing Project

DEFINITELY IN MY BACKYARD: MAKING THE BEST CHOICES FOR YOU AND THE ENVIRONMENT

This brochure compares the maintenance of seven different kinds of garden, each with different requirements in terms of time, cost, water, fuel, fertilizers and pesticides. The gardens evaluated are: Xeriscapes; Woodland shade gardens; Wildflower meadows; Conventional lawns; Low-maintenance lawns; Ornamental trees and shrubs; and Ornamental flower beds. Includes coloured illustrations and graphs.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 8 pages

Order number: NHA 2502

NOTE : Aussi disponible en français sous le titre : *Vraiment dans ma cour : prendre les meilleures décisions pour vous et pour l'environnement*

STATUS : New Completed Brochure
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

DEVELOPING CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

This report presents key considerations for the development, marketing and distribution of consumer-oriented information materials focusing on those community planning elements over which consumers have direct influence. This study was commissioned to determine a strategy for developing, marketing and distributing proposed products in this area, but the lessons learned from the research can be useful to other housing stakeholders.

The information and conclusions are based on research consisting of:

- a literature review and six in-depth interviews to provide insight into key concerns and directions for the study;
- a full-day, brainstorming session with housing researchers to determine priority topic areas, goals, target audiences and five product concepts to be tested;
- 12 consumer focus groups held across Canada; and
- 30 in-depth interviews with potential clients/partners.

The study found:

- Awareness of sustainable community planning issues is low among consumers. The environmental dimension of community planning is not clear to them. Neither are the benefits of sustainable communities. At the same time, many consumers find sustainable community planning to be an intriguing concept. Of the various sustainable community topics, sustainable landscaping sparks consumer interest the most. Consumers appear to be the least receptive to compact communities.
- Information on this topic should focus on those aspects that make communities great places to live. Great livability should be the one overriding impression that consumers are left with regarding these communities. Specifically, information materials should stress the human dimension of sustainable communities and the potential personal benefits that resonate most strongly with consumers: community interaction and dialogue with neighbours, access, convenience, safety, affordability, recreational opportunities and so forth.
- Finally, the information materials should also highlight the notion of options (and longevity) within the community, that is, that a variety of housing choices are available to accommodate the needs of a range of lifestyles and life cycles.

Prepared by Cullbridge Marketing and Communications & GLPI for Canada Mortgage and Housing Corporation. Ottawa: CMHC, c1999.

Order number: PE 0339

NOTE : Aussi disponible en français sous le titre : *Élaboration d'une base de renseignements sur la planification de collectivités durables à l'intention des consommateurs,* PF 0339

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products

700 Montreal Road, Suite 1000, Ottawa, Ontario, K1A 0P7

1-800-668-2642

Fax orders from Canada: 1-800-245-9274

International clients see page 9 for order instructions.

HEALTHY HOUSING SEMINAR

A two and a half hour consumer Healthy Housing seminar, with a renovation focus, has been developed and packaged for delivery. The material was based on existing material produced by the CMHC Ontario and British Columbia Regional offices. It was also updated to include recent research and to give it a national scope. Examples of case studies were included by incorporating material from the 1994 and 1996 Renovation Demonstration projects. CMHC is currently negotiating a partnership with the building supply industry for delivery of these seminars. A partnership has now been established for Quebec, British Columbia, New Brunswick, Nova Scotia, and Newfoundland. RenoDepot is delivering the seminar in Quebec, Home Depot in B.C., and Kent Building Supplies in the Atlantic. Negotiations with other partners are still underway. A condensed 30-minute presentation of the Healthy Housing Seminar was also produced. This material can be used at home builder association meetings, various industry shows and conferences and also in the preparation of background documents.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project

OVERCOMING THE BARRIERS TO SUSTAINABLE REAL ESTATE DEVELOPMENT IN CANADA

The research will establish the features or framework by which a community might be deemed to be considered sustainable. Using this analytical framework it will develop a clear picture of the status of sustainable development in Canada and the barriers being faced in the implementation of sustainable communities. It will develop a parallel analysis of successful international projects focusing on those which successfully address problems encountered in Canada and from this comparison generate potential directions which might assist Canadians in overcoming barriers to sustainable real estate development.

CMHC Project Officer : *Doug Pollard*
CIDN : 2051 0200002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

PRACTICES FOR SUSTAINABLE COMMUNITIES

The purpose of this project is to develop an updated advisory document on community planning and design. The updated document is intended to be a state-of-the-art report, reflecting the latest thinking in the field. The emphasis of the document will be on presenting practical examples (best practices and case studies) of innovative, sustainable and cost-effective approaches to community planning and design. Final report is in production.

CMHC Project Officer : *Brian Eames*
CIDN : 1553 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

RESIDENTIAL GREENWAYS IN TRANSITION: FOUR DECADES OF PRACTICE IN WATERLOO

This research examines the evolution and assesses the merits of residential greenways employed in the City of Waterloo over the past four decades.

CMHC Project Officer : *Susan Fisher*

CIDN : 2144 0200015

Division : External Research Program

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

RESIDENTIAL LANDSCAPES: COMPARISON OF MAINTENANCE COSTS, TIME AND RESOURCES

Many homeowners have in recent years become increasingly aware of the potential impacts landscape maintenance can have on the environment. Consequently, many are now looking for ways to maintain attractive and functional residential landscapes while reducing the potential for environmental impacts in their yards, as well as saving costs and time by adopting low-maintenance landscape options. However, assertions about the time and cost savings and environmental benefits of the low-maintenance alternatives have not been substantiated with observed data collected from Canadian homes. The purpose of this report is to begin the process of filling this gap, by comparing the various cost, material and time inputs associated with the maintenance of seven residential landscape types, both conventional and alternative. As well, the report includes an overview of the potential environmental impacts and benefits related to these seven landscape types and their maintenance.

Conventional landscape types reviewed in this study include: conventional lawns; ornamental trees and shrubs; and ornamental flowerbeds.

Alternative landscapes in this study include: xeriscapes; woodland shade gardens; wildflower meadows; and low-maintenance lawns.

Prepared by Ecological Outlook. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 2000.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

RYDER LAKE "URBAN VILLAGE": DEVELOPMENT PLAN FOR A SUSTAINABLE COMMUNITY = LE VILLAGE URBAIN DE RYDER LAKE : PLAN D'AMÉNAGEMENT POUR UNE COLLECTIVITÉ DURABLE

Chilliwack, a community of sixty-five thousand located in British Columbia's Lower Mainland region, has responded to the challenge of accommodating a fast-growing population in an environmentally responsible manner by launching a project to build a sustainable community or "urban village" on 2,500 hectares in the adjacent hillside area of Ryder Lake. Recognizing the groundbreaking nature of such an initiative, in fall 1994, the AsCsT Program awarded the District of Chilliwack's Municipal Development Department a grant to be used towards the preparation of a plan, including development policies, standards and guidelines, for a high-density, compact community of approximately 40,000 people. A related goal of this project was to create an efficient approvals process for permit applications for development in Ryder Lake.

This AsCsT project resulted in the preparation of the Ryder Lake Area Plan ("The Plan"). The Plan proposes the use of a combination of flexible regulatory tools to guide the development of the Ryder Lake sustainable community. As a starting point, the District designated the entire Ryder Lake area as a "Development Permit Area" under the Municipal Act. This approach allows the District to protect the natural environment and to establish guidelines regarding the form and character of commercial and multi-family development. Furthermore, construction in Ryder Lake will be regulated by the application of performance standards rather than conventional prescriptive standards which are typically used to control suburban development. By focusing on the objectives and intent of the design, performance standards provide municipal authorities with an acceptable amount of control over the development process while, at the same time, enabling developers to build in a more creative manner.

The goals of the AsCsT Program - improving housing affordability, choice and quality through regulatory change - are clearly reflected in the development of sustainable communities such as Ryder Lake. The results of this project are very much applicable to other communities wishing to plan growth and development in a way that enriches the lives of its citizens while respecting the environment.

Affordability and Choice Today (A.C.T.) Demonstration Project / District of Chilliwack, British Columbia. Prepared by Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations; CMHC, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SOIL AND FLORA RESTORATION AFTER GROUND DISTURBANCE

This research will examine local soils and indigenous plants in the North to arrive at a Best Practices Guide for means of restoring healthy ground cover after disturbance, at the least cost. In the North especially, ground cover loss exacerbates erosion of buildings, roadways and community infrastructure. Soil damage due to exposure leads to summer dust which deteriorates building exteriors and heating systems; impedes the operation of windows and doors; and affects the health of both the occupants and the community at large. Ground cover damage is also one of the leading factors for the break-down of permafrost. The Guide will be of interest to communities, health care providers, northern government housing agencies as well as to other northern countries. The work will be complete by the end of 2000.

CMHC Project Officer : *Aleta Fowler* **Division :** Research Division

AVAILABILITY : Publication is not available ***STATUS*** : Ongoing Project

SOUTHEAST FALSE CREEK DESIGN CHARRETTE: EXPLORING HIGH DENSITY, SUSTAINABLE URBAN DEVELOPMENT

The Southeast False Creek (SEFC) sustainable neighbourhood planning project is an initiative to redevelop approximately 32 hectares (79 acres) of industrial land on the False Creek waterfront, in the downtown of the city of Vancouver, as a residential neighbourhood for between 8,000 and 10,000 people. Southeast False Creek is being designed to embody the principles of sustainable development in a manner appropriate to the scale, location, context, opportunities and constraints of the site.

This report summarizes the results of a design charrette partially funded by Canada Mortgage and Housing Corporation (CMHC), in partnership with the City of Vancouver, held in October 1998, to explore the implications of sustainable guidelines and separate policies proposed for the SEFC, particularly about 19 hectares (47 acres) of city-owned land within the 32-hectare (79 acre) study area. A core principle in the planning of the SEFC is that it should be a transferable model of high-density sustainable urban development.

This report includes a brief history of the guideline development, the reasons for holding a charrette, a synopsis of CMHC research that was used, a critique of the effectiveness and value of the charrette. The report also includes drawings done at the charrette itself.

Prepared by Dianne Perrier, Mark Holland, Fiona Crofton. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Doug Pollard. Ottawa: CMHC, c2000 (Healthy Housing and Communities Series) xiv, 103 pages.

NOTE : Aussi disponible en français sous le titre : *Charrette de conception pour le secteur Southeast False Creek*

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SUSTAINABLE APPROACH TO SUBURBAN DEVELOPMENT IN KOREA: A DEMONSTRATION IN THE SOODONG VALLEY

This document presents a step by step planning process for helping Korea move towards sustainability. This report describes a sustainable approach to suburban housing. it includes a planning framework intended for use by developers of garden-style housing anywhere in the country. It also includes a case study in which the planning framework has been used to create a concept plan. The case study includes planning and construction guidelines for a proposed 100-unit housing development in the Soodong Valley, northeast of Seoul. It is hoped that the examples presented will provide guidance to the Korean housing industry on how to construct garden-style housing in a manner that is sensitive to the environment, appropriate to the needs of the Korean populace, and representative of the best Canadian building and planning expertise. The project has been jointly sponsored by Canada Mortgage and Housing Corporation (CMHC), and by the Korea Housing Institute (KHI). The proposed demonstration site is owned by a Lifecare Consulting Co. Ltd., a company owned by Mr. Jin H. Kim, a Korean-Canadian architect. Mr. Kim operates a small college in Seoul where he teaches wood frame housing design. He participated in the project as an advisor to KHI, and has contributed many suggestions useful in the preparation of the concept plan for the site.

Prepared by the Sheltair Group Inc. and Ramsay Worden Architects Ltd. Prepared for Canada Mortgage and Housing Corporation and Korea Housing Institute. CMHC Project Officers: Jay Thakar and Murray Rasmusson. Ottawa: CMHC, 1999.

NOTE: Issued in English and in Korean

STATUS : New Completed Report

AVAILABILITY : NOTE: Available on a loan basis only from:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SUSTAINABLE COMMUNITY DESIGN

This project sought to identify the features of a sustainable community and how they can be applied to the design of a new community. Several Canadian and international examples of built or proposed communities were used to seek out theses features. It also tried to test consumer response to these design features by using images and facts from these example case studies and from a proposed design for a Canadian subdivision.

The study results are incorporated in a CD-ROM. It presents 150 sustainability features organized in distinct categories ranging from the house scale to the large community level. Text and images describe each feature and its effect on sustainability. All features are linked to a set of case studies where they are shown with pictures, drawings or diagrams. A list of references supports each aspect of community design along with Internet connections to many original sources. This component of the disc provides an extensive and comprehensive check list of all the elements that need to be considered in the design of a sustainable community. The visual descriptions of these elements would assist a designer in setting a starting point for a planned new community.

Visualizing the attributes of a sustainable community can also help gauge consumer reaction. The disc includes a complete questionnaire, in a sequence of electronic images, that can be used as a means of exploring the market for innovative features which cannot be found and experienced in real life settings.

Prepared by Eduard Epp, Richard Perron, William T. Perks, Chris Sale, David van Vliet.
Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

NOTE: CD-ROM available by interlibrary loan only.

STATUS : Completed Report
AVAILABILITY : Interlibrary Loans
Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2365 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SUSTAINABLE MUNICIPAL INFRASTRUCTURE DESIGN FOR A RESIDENTIAL DEVELOPMENT

This project's objectives are to review current practices pertaining to suburban communities in Southern Ontario, Canada and in other parts of the world; consider alternative design options for subdivisions and provide practical and up-to-date recommendations for the incorporation of sustainable community features.

***CMHC Project Officer* :** *Susan Fisher*

CIDN : 2144 0200021

Division : External Research Program
Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

WORLD'S BEST HOMES: GETTING BETTER ALL THE TIME

This free brochure encourages adoption of Healthy Housing principles, promotes CMHC Healthy Housing research, introduces the concept of FlexHousingTM and increases awareness of CMHC products and services.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 8 pages

Order number: NE2382

NOTE : Aussi disponible en français sous le titre : *Les meilleurs habitations au monde.*

STATUS : New Completed Brochure

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

➡ SEE ALSO: *Sustainable Development in Canada*, p. 197

CASE STUDIES OF POTENTIAL APPLICATIONS OF INNOVATIVE RESIDENTIAL WATER AND WASTEWATER TECHNOLOGIES

Objectives of this project were to identify and describe opportunities for use of innovative water supply and wastewater systems for residential buildings, to compare costs and benefits of traditional and innovative systems, and to propose solutions that could lead to more cost-effective and environmentally friendly housing. The innovative technologies considered are those used in the Toronto Healthy House: a rainwater cistern system, and recycling of all household wastewater, for non-potable uses. In five case study sites in Nova Scotia, life cycle costs of these technologies were compared with costs of traditional infrastructure alternatives -- municipal water and wastewater, or wells and on-site sewage disposal systems. These comparisons indicate that the Healthy House technologies could be cost-competitive in an urban or suburban subdivision if fire protection is not required; a non-urban area as an alternative to a cluster system, or in a non-urban area as an alternative to a remedial central system. Other situations where they might be appropriate are also discussed. Other non-cost issues -- technological, management, regulatory, and public and political -- that must be considered if these technologies are to be adopted are identified and discussed. Recommendations are offered about strategies and actions that can take advantage of opportunities and address problems and issues related to adoption of innovative technologies for residential water supply and wastewater management.

Prepared by D.H. Waller, M.A. Salah, Centre for Water Resources Studies, DalTech. CMHC Project Officers: Peter Russell, Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS

CMHC, in partnership with City of Toronto Better Buildings Partnership, will document case studies of water conservation retrofits for multi unit residential buildings. The building profile, water conservation measures, costs and resulting water and energy savings will be described. The studies will serve as examples to encourage water use efficiency in other building and will eventually appear on CMHC's website.

CMHC Project Officer : *Cate Soroczan*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

DEVELOPMENT OF A RESIDENTIAL WATER USE MODEL

The first phase of this project developed a user-friendly computer model that determines daily water consumption for a prescribed pattern of water use in a house that incorporates facilities to treat and reuse grey water. The program will be of value to designers of innovative residential plumbing systems. Its first application was in the design of the water system for the Toronto Healthy House and the Conservation Co-op apartment building in Ottawa. This second phase of the project saw the revision of the WaterSave program to more realistically represent water quality and account for contamination concentration build-up in the recycled water. Sample reuse situations were also accounted for in the revised model and the user's manual was updated. The Software and manual are currently being translated into French.

STATUS : Completed

AVAILABILITY : Once completed the software will be available on the water website
http://www.cmhc-schl.gc.ca/rd-dr/en/water-eau/index.html

DEVELOPMENT OF AN ACTION PLAN TO ADDRESS CANADA'S RESIDENTIAL WATER AND WASTEWATER ISSUES

CMHC is working in partnership with Canadian Water and Wastewater Association to conduct 1 day seminar sessions across Canada in conjunction with the regional water and waste associations annual meetings. This series has been rescheduled for 2001.

CMHC Project Officer : *Cate Soroczan*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

NEW

ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES

To undertake and complete an economic feasibility study of water reuse and treatment technologies. The contractor will assess ten case studies of on-site water reuse applications. Final draft has been received and the case studies will be uploaded to the CMHC water website on a monthly basis. Further attention is being paid to the financial aspects of water reuse and full costing.

CMHC Project Officer : *Cate Soroczan*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2089 0200002

STATUS : Ongoing Project

HOUSEHOLD GUIDE TO WATER EFFICIENCY

Based on a highly successful document by the Region of Durham this project will create a Canadian Water Efficiency Guide for homeowners. The document has been modified to account for national water use and pricing statistics, regional water needs, and regionally appropriate information on xeriscaping. Priced copies are being made available to municipalities on a volume basis at present.

CMHC Project Officer : *Cate Soroczan* **CIDN** : 2238 0200
Division : Research Division **STATUS** : Completed
AVAILABILITY : Cate Soroczan

IMPROVEMENTS IN ON-SITE WASTEWATER TREATMENT

An innovative on-site wastewater treatment and disposal system was installed and tested on a 2900 sq.metre site, for a single family house in Lunenberg County, Nova Scotia. The system comprised a conventional septic tank and disposal trench, plus a Waterloo Biofilter to pretreat the effluent and reduce some of the burden of treatment from the soil, which is important for marginal or compromised site conditions. Care was taken to practice water conservation via low flow appliances only - i.e. without on-site water reuse which can permit the further downsizing of equipment. However partial recirculation of the treated effluent (after the Waterloo Biofilter) was found to increase nitrogen removal without larger equipment despite cold climate conditions.

CMHC Project Officer : *Chris Ives* **CIDN** : 1047 0200001
Division : Research Division **STATUS** : Ongoing Project
AVAILABILITY : Publication is not available

LIVING BY WATER GUIDEBOOK

The objective of this project is to prepare, publish, market and distribute a guidebook for waterfront residents on reducing environmental impacts of housing on aquatic and shoreline habitat.

CMHC Project Officer : *Susan Fisher* **CIDN** : 2040 0200001
Division : Research Division **STATUS** : Ongoing Project
AVAILABILITY : Publication is not available

ON-SITE STORMWATER MANAGEMENT ALTERNATIVES

This study will provide practical information to municipalities and developers to encourage them to adopt stormwater management alternatives both at the lot and community level. It will examine the costs and benefits of practical solutions as well as the barriers to implementation through a series of case studies. The case studies are available on a monthly basis on the CMHC water website.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : See above
STATUS : Ongoing Project

PERFORMANCE ASSESSMENT OF BOOSTER PUMP CONTROLS FOR WATER AND ENERGY CONSERVATION

This pilot study, in partnership with Metro Toronto, Minto, and CMHC will assess the performance of two different booster pump control systems in 6 mult-unit residential buildings. Booster pump performance shall be measured in terms of electrical energy and water savings. The study will assess the impact of booster pump savings on buildings retrofitted with water efficient fixtures to ensure that only the technology application is measured without the influence of other concurrent changes. By utilizing 6 buildings with different characteristics, (size, # units, occupancy type), the work will also attempt to define what type of building profile will most benefit from utilizing this control system. Work is currently underway to assess baseline water consumption levels.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available
STATUS : Ongoing Project

QUAYSIDE VILLAGE GREYWATER DEMONSTRATION PROJECT

A greywater system similar to that of the Toronto Healthy House system is being implemented into a 19 unit cohousing project in North Vancouver, B.C. This system will be capable of treating greywater from sinks, laundry, and showers for reuse in showers, laundry and toilets. Initial testing will be restricted to toilet reuse only. Double plumbing has already been installed and the greywater system is being installed following the signing of a contractual agreement between the city and development regarding ongoing monitoring and maintenance. Upon completion the system will be subject to continuous on-line water quality monitoring and laboratory analysis to ensure that both the system and the on-line monitoring is working to satisfaction. The system is now working and monitoring is underway. A case study outlining the project and system is available on the cmhc water website http://www.cmhc-schl.gc.ca/rd-dr/en/water-eau/index.html

CMHC Project Officer : *Cate Soroczan*
CIDN : 1991 0200
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

SUSTAINABLE HOME WATER SYSTEM AT THE ALBERTA SUSTAINABLE HOME/OFFICE

The objectives of the Sustainable Home Water System (SHWS) project were:

- to design an autonomous home water system which includes a rainwater collection, storage, and treatment system; greywater heat recovery; and a greywater treatment and recycling system;
- to install the SHWS at the Alberta Sustainable House as a demonstration prototype;
- to monitor and evaluate the performance of the SHWS and greywater heat exchangers; and
- to determine the SHWS viability in the Canadian housing industry as a retrofit and for new home installations.

The Sustainable Home Water System (SHWS) at the Alberta Sustainable Home/Office reduces total residential water use by 78% compared with average Calgary households.

Collected rainwater is treated on demand to satisfy potable water requirements and meets Canadian Drinking Water Quality Guidelines (1996) for all parameters tested, however aesthetic objectives are slightly exceeded for temperature.

Heat from greywater is reclaimed through the counter current and drum storage greywater heat exchangers contributing 7.4% and 4.4% respectively to hot water heating. In-series operation accounts for 16.8% of the hot water heating required at the ASH home/office.

The greywater is treated using slow sand filters, soil box subirrigation, and a Greywater Garden Wall. The treated greywater conforms to non-potable water guidelines from several US states, apart from the elevated levels of total suspended solids. This reuse water satisfies 86% of the total ASH home/office water demand (i.e. ultra low flush toilet, bathing, clothes washing, and subsurface irrigation).

The Sustainable Home Water System is a cost-effective, environmentally-friendly, safe home water system which can easily be installed in new homes, and SHWS components can be incorporated into existing residential water systems. Maintenance and operation requirements are inexpensive and require limited time, however, a complete understanding of the system is required. Further research, monitoring, and adaptations to the water treatment system will be continued to improve the SHWS.

Prepared by Jorg Ostrowski and Karen Braun, A.C.E. - Alternative & Conservation Energies, Inc. CMHC Project Officer: Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1998. (Housing Technology Incentives Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

WATER QUALITY GUIDELINE AND WATER MONITORING TOOLS FOR RESIDENTIAL WATER REUSE SYSTEMS

This paper discusses the requirements for a monitoring and control protocol for small residential water reuse systems. It reports the findings of a workshop held with key personnel from health and environmental agencies: On-site Water Reuse in Canada - Ottawa '99 Protocol. The paper identifies and describes various monitoring parameters and control system components which are available and reviews their application in a residential water reuse system. The contents of this paper will be of particular interest to homeowners, property managers, consulting engineers and regulatory agencies wishing to assess available monitoring and control technologies and review the elements of a long-term monitoring and water quality control protocol.

Prepared by J. Stidwill and R. Dunn, totten sims hubicki associates. CMHC Project Officers: Cate Soroczan and Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Healthy Housing and Communities Series)

Order number: PE 0382

NOTE : Aussi disponible en français sous le titre : *Lignes directrices sur la qualité de l'eau et outils de surveillance de l'eau pour les réseaux de réutilisation de l'eau dans les résidences*

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road, Suite 1000, Ottawa, Ontario, K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

WATER RECYCLING DEMONSTRATION

The goal of this project was to produce a water recycling unit that is created from off the shelf components. Eight units in Ottawa's Conservation Co-operative are double plumbed for the reuse of treated shower water for toilet use. Analysis of the initial system indicated a number of design flaws. A second system is now up and running and performance monitoring is underway. While initial monitoring results indicated that the system was working well and water quality was meeting all requirements, subsequent follow-up with tenants indicated problems with noise, odour and pressure drops. It is anticipated that these shortcomings will be worked out in the following months.

CMHC Project Officer : *Cate Soroczan*

CIDN : 1573 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

PREPARING YOUR APARTMENT FOR Y2K. ABOUT YOUR HOUSE SERIES; CE 20

This guide has been prepared to provide you with the necessary information to assess the degree to which the Y2K problem could affect your apartment and building. This guide focuses on the appliances, equipment and systems which provide for your health, comfort and security: local utilities, electricity, water, fresh air, electronic access systems and heating. Information regarding consumer goods such as VCRs, camcorders, stereos, televisions, and home computers can be obtained directly from the manufacturer or the store where you bought them.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

NOTE : Aussi disponible en français sous le titre : *Préparer votre appartement au passage à l'an 2000.*

STATUS : Completed Fact Sheet

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

PREPARING YOUR HOME FOR Y2K. ABOUT YOUR HOUSE SERIES; CE 16

This guide has been prepared to provide you with the necessary information to assess the degree to which the Y2K problem could affect your home. This guide focuses on the appliances, equipment and systems which provide for your health and security: loss of electric power, loss of natural gas, loss of water supply, and communications. Information regarding consumer goods such as VCRs, camcorders, stereos, televisions and home computers can be obtained directly from the manufacturer or the store where you bought them.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

NOTE : Aussi disponible en français sous le titre : *Préparer votre habitation au passage à l'an 2000.*

STATUS : Completed Fact Sheet

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SOCIO ECONOMIC RESEARCH

ADDRESSING SPECIAL HOUSING NEEDS IN FIRST NATION COMMUNITIES

In the 1991 Census, the rate of disability reported by Aboriginal adults was twice as high as that in the Canadian population as a whole. Specifically in the area of housing, the report on the Round Table on Disabilities in First Nations Housing in 1993 referred to a range of problems including a lack of alternative housing, the need to review policies to identify barriers to service provision, and the inappropriateness of prevailing barrier free home designs for Indian reserves.

"Completing the Circle", the Standing Committee report on Aboriginal people with disabilities talked of the need for co-operation and support at the community level if the problems of disabled Aboriginal people are to be addressed. The Department of Indian and Northern Development evaluation of their contribution to the National Strategy for the Integration of Persons with Disabilities found that lack of information is the most significant barrier to First Nations people in finding the help they need.

Using the findings of these initiatives as a framework, as well as the findings of the Home Adaptations for Seniors Independence evaluation, this study profiles specific on-reserve communities in Atlantic Canada, identifying how they are addressing the housing needs of their disabled members, and on the basis of this, developed strategies and mechanisms for such communities to do it effectively.

The report identified recommendations for action by stakeholder groups (Aboriginal organizations in partnership with government) and by individual First Nation communities themselves. It also provided an evaluation of the objectives of the project.

A common element among the recommendations is the need for First Nation disabled people to play a key role in all issues affecting them including: identifying needs, establishing criteria for assistance, making decisions, and being the advocating voice. Another common element is the need for First Nation communities to take a proactive planning approach to meet the special needs of disabled and elderly in their communities, incorporating their needs into the bigger picture of planning for the future of their communities.

The "Completing the Circle" report identified that there were major gaps and administrative problems in meeting the needs of disabled Aboriginals. This research confirmed that in Atlantic Canada First Nation communities there are still a number of problems related to these issues. In particular, this research found that there is concern about the inability, real or perceived, to access provincially funded programs to meet on-reserve needs and the uneven provision of basic support services across the communities.

Prepared by: Rural and Small Town Programme. David Bruce, Senior Associate and Tracey Weatherston, with John Higham and Judy Reid. Ottawa: Canada Mortgage and Housing Corporation, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS

The goal of this project is to develop a communications and information transfer strategy that will help CMHC in its interactions with Aboriginal housing groups regarding capacity development, research and information transfer activities. To be effective, information has to reach the audience that matters and be in formats that have the maximum impact.

The study looks at the barriers to finding and using housing related information, what makes housing related information relevant, what are key influences, and how effective are the available communications vehicles and distribution channels, all in regard to Aboriginal audiences.

The project consists of: an assessment of existing communication strategies and marketing research in the area of housing information and training; personal or telephone interviews with senior officials of key national and provincial stakeholder groups; group discussions with a broad range of the key client groups as defined in target audiences; and development of alternative communications and information transfer strategies for CMHC and assessment of their relative costs.

The target audience for this project is made up of: key decision makers in housing operations and policies, provincial organizations chosen to give regional coverage, major national organizations, and regional CMHC program officers.

The geographic coverage is Canada wide. All types of Aboriginal community, on or off-reserve in rural, remote and urban communities are included.

CMHC Project Officer : *Philip Deacon*

CIDN : 2225 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

CORE HOUSING NEED AMONG OFF-RESERVE INUIT, MÉTIS, STATUS AND NON-STATUS INDIANS IN CANADA

This study, based on the 1991 Aboriginal Peoples Survey (APS) and 1991 Census, explores housing need among Inuit, Métis, Status and Non-Status Indian peoples living off-reserve. It profiles the factors that influence the high levels of core housing need experienced by each individual Aboriginal group.

The report brings to light two key conclusions regarding the overall incidence of Aboriginal housing need off-reserve:

- a large proportion of Aboriginal households located in northerly, remote areas of the country occupy housing that is crowded, in need of major repair and lacking adequate bathroom facilities. These physical housing problems are most commonly experienced in Labrador, the northern Prairies and the Northwest Territories; and,
- Aboriginal households are especially likely to fall into core housing need - that is lacking access to housing that is adequate in condition, suitable in size and affordable - in a number of urban areas in Western Canada, most because they are dedicating high proportions of their income to shelter.

Prepared by Ark Research Associates, Ark Research Manager: Aron Spector. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: John Engeland. Ottawa: CMHC, 1998.

Order Number PE0295

NOTE : Aussi disponible en français sous le titre : *Les besoins impérieux de logement des Inuit, Métis et Indiens inscrits et non inscrits vivant hors des réserves, au Canada, PF0295.*

STATUS : Completed Report
AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

PROPERTY INSURANCE ON-RESERVE: PRESENT ARRANGEMENTS, AND INNOVATIONS TO REDUCE THE COST: FINAL REPORT

The study is an examination of initiatives to reduce the cost of property insurance on-reserve. It considers property insurance on band-owned stock, and on houses owned by individuals whether through certificates of possession or other home ownership type tenures, to explore the ways different First Nations across the country are approaching the matter of obtaining property insurance. A survey of 116 First Nations was completed. The paper documents how First Nations presently go about arranging insurance, and identifies some of the innovations underway at the community, regional and national level to help reduce the cost. Advice to First Nations to assist in getting better and lower cost property insurance has been provided.

Prepared by Tony Wellman. Survey conducted by BomCor Associates. CMHC Project Officer: Vernon S. Barkwell. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program) 44 pages.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

PROPOSAL FOR RESEARCH AND CONSULTATION ON INUIT HOUSING

The objectives of this project are to to develop a more current understanding of housing problems and priorities in Inuit communities, investigate and identify "best practices", and develop a housing strategy which will include innovative new means of financing and alternative forms of housing recognizing that there is no funding for new housing commitments off-reserve through CMHC.

CMHC Project Officer : *Line Gullison*
Division : Strategic Planning
Policy & Marketing
AVAILABILITY : Publication is not available

CIDN : 2315 0100001
STATUS : Ongoing Project
NEW

RISK MANAGEMENT AND INSURANCE IN ABORIGINAL COMMUNITIES: TWO CASE STUDIES

The cost of insurance is often three times higher in Aboriginal communities than in comparable non-Aboriginal communities. Previous research has shown that less than half of this extra cost can be justified because of the extra risks involved. This report describes two examples of Aboriginal communities who reduced the costs of their insurance through applying a risk management approach and competitive tendering. The 14 Inuit communities of the Kativik Regional Government in Nunavik achieved a decrease of 50% in cost, followed by a further reduction of 20% two years later. The scope of the coverage was improved with the same broker and insurance company as before. The Naskapi Band of Quebec took the same approach. It saved some 70% on the cost of insurance, while improving the quality of its coverage. Here the broker and insurance company changed. Risk management is a continuous and systematic series of activities with three distinct goals: to minimize the likelihood of accidents, to limit their severity, and to ensure that the pre-accident situation can be restored.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 16 pages.

NOTE: Also published in English under the title: *Risk Management and Insurance in Aboriginal Communities: Two Case Studies.*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

URBAN ABORIGINAL ACCESS TO HOUSING (AND HOMELESSNESS)

This research study will develop a survey instrument to measure the longitudinal profile of Aboriginal household mobility, access to housing and homelessness using a historical interview technique. Snapshot surveys tell us that Aboriginal households are significantly more mobile than non-Aboriginal. This hyper mobility includes not only movement between reserve or home community and urban areas, but also between urban areas and within urban areas. The hyper mobility may lead to frequent difficulties in accessing accommodation, especially when coupled with the low socio-economic status of many Aboriginal households and discriminatory practices of some landlords. Some literature suggest that this combination of circumstances could be a major factor leading to Aboriginal homelessness. About 45% of the Aboriginal population live in cities and this segment of the population is expected to grow by almost half by 2016, which will likely exacerbate the situation.

CMHC Project Officer : *Philip Deacon*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2160-020001
STATUS : Ongoing Project

EVALUATION STUDY OF CMHC'S DIRECTED RESEARCH

The objective of this project is to carry out an evaluation study of CMHC's directed research.

CMHC Project Officer : *Patricia Streich*
Division : Audit and Program Evaluation Services
CIDN : 2170 0500001
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

HISTORY OF THE CMHC'S FIRST FIFTY YEARS (1946-1996)

The purpose of this project is to write a history of CMHC's first fifty years (1946-1996).

CMHC Project Officer : *Eric Tsang*
Division : Strategic Planning
Policy & Marketing
CIDN : 2113 0600001
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

SUMMARY OF THE CORPORATE PLAN, CANADA MORTGAGE AND HOUSING CORPORATION 2000-2004 = RÉSUMÉ DU PLAN D'ENTREPRISE, SOCIÉTÉ CANADIENNE D'HYPOTHÈQUES ET DE LOGEMENT 2000-2004

This Summary of the 2000-2004 Corporate Plan for Canada Mortgage and Housing Corporation (CMHC) and the 2000 annual budget are required by the Financial Administration Act. The Summary briefly profiles CMHC, highlights key achievements for 1999 and discusses external factors affecting CMHC. The Summary also sets out how CMHC plans to meet its four corporate objectives from 2000 to 2004, and how CMHC's activities and their results will make a difference to Canadians. Finally, the Summary presents CMHC's financial plans and the resources it requires to carry out federal housing policy over the next five years.

Ottawa : CMHC = SCHL, 2000.

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CHILDREN'S ENVIRONMENTS

HOUSING CANADA'S CHILDREN

This project creates a comprehensive, objective, insightful and prospective picture of children's' housing conditions and communicates this picture in clear unambiguous language supported by data. The work asserts that most of Canada's children are well housed. However, a significant minority are raised in households that are in core housing need. The research draws attention to the potential link between housing that is below current norms and poor developmental outcomes of children.

CMHC Project Officer : *Fanis Grammenos*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

** SEE ALSO: *Services for Children and Youth in Canadian Shelters for Homeless Families*, p. 158

CITY PLANNING AND HUMAN SETTLEMENTS

ASSESSING THE FULL COSTS OF WATER, LIQUID WASTE, ENERGY AND SOLID WASTE INFRASTRUCTURE IN THE FRASER VALLEY REGIONAL DISTRICT

The project develops the foundation for an Environmental Management System tool for profiling and comparing the performance of certain environmentally related data predicated upon the Fraser Valley Regional District (FVRD). Using a series of key indicators to measure performance in environmental and economic terms and combining database software with Geographical Information System (GIS) software the project develops a system of allowing the researcher to compare indicators of performance at varying spatial scales with the census tract as the smallest spatial unit.

CMHC Project Officer : *Doug Pollard*

CIDN : 2127 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

NEW

GRANVILLE ISLAND: AN URBAN OASIS

Twenty years ago, Granville Island was transformed from a decrepit 37-acre industrial slum in Vancouver's False Creek to possibly the most successful urban redevelopment ever seen in North America. Rusty tin-sided factories were reborn as a public market, an art school, shops, restaurants, theatres, and a great deal more. Today, Granville Island boasts more than eight million visits a year, 2,600 jobs and the highest sales per square foot of any public market on this continent.

This book chronicles the Granville Island story, celebrates what the Island has to offer, and peers inside its seldom-seen inner life. It describes the Island's heritage, its transformation, attractions and amenities and its working life.

Prepared by Michael McCullough. Vancouver : Granville Island Office, Canada Mortgage and Housing Corporation, 1998.

** Price: $39.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : Granville Island Office
Canada Mortgage and Housing Corporation
1661 Duranleau St., 2nd Floor, Vancouver, BC, V6H 3S3
Tel.: 604-666-6655
Fax.: 604-666-7376

PROGRAMME ÉCO-QUARTIER DE LA VILLE DE MONTRÉAL: UNE INNOVATION EN ÉVOLUTION

The Éco-quartier program was organized by the City of Montreal to involve its citizens in locally-based environmental initiatives. The purpose of this report is to evaluate the program so that readers from Montreal and all municipalities across Canada can benefit from lessons learned.

This innovative program responds to local environmental needs, most particularly collecting recyclable materials and greening the city. However, it has not addressed large-scale environmental problems such air pollution. In this regard, it has been more focused on issues that directly affect local citizens. Thus the mandate or scope has been somewhat limited.

Regarding its greening the city activities, a horticultural approach has been favoured over an ecological approach, i.e. beautification over biodiversification. Interviews reveal that participation in the activities by citizens has been weak on the design and maintenance of the planted sites, but that local citizens enjoy the initiatives and feel that they fill a social need.

To improve the program, the organizers should involve residents in all phases of the projects, favour use of public spaces over private lots, and make better use of partnerships. They should also expand the program to address other local environmental issues.

Prepared by Gilles Sénécal and Diane Saint-Laurent with the collaboration of Anne-Marie Charlebois and Daniel Léonard. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

COOPERATIVE AND NON-PROFIT HOUSING

CASE STUDIES OF BEST PRACTICES IN BOARD RENEWAL

The purpose of this project is to identify the issues of volunteer boards with respect to recruiting and maintaining top quality board members and develop three case studies of best practices in board renewal.

CMHC Project Officer : *F. Barros*
Division : Assisted Housing Division

CIDN : 2253 1500002
STATUS : Completed

CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION

This research project concerns crisis situations in housing cooperatives: the conditions in which they emerge, but especially the dynamics put in place to resolve them.

CMHC Project Officer : *Marie Murphy*
Division : External Research Program
Research Division

CIDN : 2018 0200001
STATUS : Ongoing Project

AVAILABILITY : Publication is not available

CONSUMER EDUCATION & COUNSELING MEASURES USED TO FACILITATE & SUSTAIN ACCESS TO HOME OWNERSHIP

To carry out a research study to review and access the nature, scope, operation and results of US home buyer education and homeowner post-purchase counseling initiatives aimed at facilitating affordable and sustainable access to home ownership and then to compare this to the current state of affairs in Canada.

CMHC Project Officer : *David Metzak*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2122 0200001

STATUS : Ongoing Project

HOMEOWNER'S MANUAL

The Homeowner's Manual was designed to provide builders with a tool to reduce the time and cost of customer callbacks. Builders can now provide their clients with a Homeowner's Manual filled with practical, easy-to-read information on operation and maintenance customized for their new home.

The Homeowner's Manual is a print-on-demand product to allow for customization. It is divided into three sections covering:

1) customized information based on the particular specifications of the individual home (e.g. type of roofing, foundation ...)
2) generic home care information, seasonal maintenance charts ...
3) a plastic sleeve for inclusion of the New Home Warranty, home plans ...

The Homeowner's Manual is endorsed by the Canadian Home Builder's Association (CHBA) as well as the Canadian New Home Warranty Council (NHWC). Builders who are members of the CHBA or provincial members of the NHWC will have the appropriate association logos printed on the cover of the product.

Builders who purchase this manual for their customers will be providing outstanding customer service, enhancing their professional image and reducing after-sales service costs.

HOME OWNERSHIP

The primary benefit to homeowners is a customized and comprehensive permanent reference tool to help them operate and maintain their new home. It has easy-to-follow text, lots of clear illustrations and environmental, money-saving and health tips.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2322 **Price: $39.95 + GST and handling charges.

NOTE: Aussi disponible en français sous le titre: *Manuel du propriétaire-occupant.*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

HOMELESSNESS

APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS

This project will examine the applicability to Canada of a continuum of care (CoC) model by conducting in-depth case studies of the CoC model in four American communities. The project will analyze the benefits and limitations of each CoC program and review its applicability in addressing homelessness in Canadian urban centres.

CMHC Project Officer : *Anna Lenk*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

NEW

CITY OF TORONTO RENT BANK PILOT PROJECT EVALUATION: FINAL REPORT

The City of Toronto established a Rent Bank Pilot Project in May, 1998 to help prevent the eviction of mother-led single parents by providing a repayable loan for rental arrears and support services. The City selected a proposal for a partnership among four community agencies in the City's downtown east end (Neighbourhood Information Post, Regent Park Community Health Centre, Central Neighbourhood House and Dixon Hall) to operate the Pilot Project. Initial funding for the project was provided by the City of Toronto and the United Way with the contribution of staff and staff resources by the participating agencies. The evaluation of the Project is funded by Canada Mortgage and Housing Corporation. In January, 1999, the Mayor's Homelessness Action Task Force also recommended that a Rent Bank be established for tenants as an eviction prevention strategy and a way of preventing homelessness.

The City retained Linda Lapointe and Tim Welch to conduct an evaluation of the Rent Bank Pilot Project. This evaluation and the recommendations developed by the consultants are the result of a six-month evaluation process that began in early 1999. In addition to data obtained on clients from the participating agencies, the consultants also attended several meetings of the Steering Committee, interviewed individuals from agencies on the Steering Committee, landlords, several Rent Bank tenants and representatives of similar programs in other jurisdictions. A mini survey was also conducted by staff on the status of the Rent Bank clients in May, 1999.

The evaluation reviews the characteristics of Rent Bank users, how the loan impacted on their lives and their housing and how the program was administered and delivered. The report concludes with a set of recommendations that will provide assistance to the City as it moves towards an expanded Rent Bank program. For the year 1999, Toronto City Council allocated a fund of $200,000 for this program.

Prepared by Lapointe Consulting and Tim Welch and Associates under the direction of Susan Bacque of the City of Toronto's Shelter, Housing and Support Division. CMHC Project Officer: Anna Lenk. Toronto: The Division, 1999.

STATUS : Completed Report

AVAILABILITY : Shelter, Housing and Support Division
City of Toronto
7th Floor, Metro Hall
55 John Street
Toronto, Ontario M5V 3C6
Tel: 416-392-1264

DOCUMENTATION OF BEST PRACTICES ADDRESSING HOMELESSNESS

CMHC has documented a cross-section of ten "best practices" projects that have effectively addressed the needs of homeless people and those "at risk" of homelessness. These projects represent a broad range of responses to homelessness and illustrate the diversity of the homeless population throughout the country.

Several criteria were developed to determine which projects to document. It was important that projects demonstrate that homeless persons were involved in developing solutions, that they were empowered to actively pursue the goal of independence, and that safety and security was offered, especially to vulnerable groups such as women, children and youth. Other factors were deemed to be important in denoting effective practices such as:

- integration of front line service providers in the development of solutions;
- multidimensional approach to meeting needs;
- variety of services to respond to sub-populations; and
- freedom to challenge current beliefs and norms about the nature of the problem.

Six projects were fully documented providing an executive summary, fact sheet, project history, client profile, management and financial profile, and a description of the overall philosophy and approach for each one. Four projects were also documented similarly but in a more condensed form.

Written by Best practice agencies. Coordinated by Luba Serge, Housing Consultant. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Gloria Neufeld Redekop. Ottawa: CMHC, 1999. (Distinct Housing Needs Series)

Note : Aussi disponible en français sous le titre : *Documentation des pratiques exemplaires d'intervention auprès des sans-abri.*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
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ENVIRONMENTAL SCAN: YOUTH HOMELESSNESS

The objective of the environmental scan is to provide:

- an overview of the homeless youth population in Canada, including their shelter situation;
- an overview of the primary distinct housing and support issues relating to homeless youth;
- recent and upcoming Canadian initiatives, including publications, reports, conferences, projects, etc. on youth homelessness;
- names of agencies and key resource people working in the field; and
- types of effective housing interventions that have benefited homeless youth.

CMHC Project Officer : *Jim Zamprelli*
AVAILABILITY : Publication is not available
Division : Research Division
STATUS : Ongoing Project
NEW

HOMELESS INDIVIDUALS AND FAMILIES INFORMATION SYSTEM (HIFIS)

In order to help shelters and municipalities develop useful and comparable information on homeless people, CMHC undertook research and developed HIFIS as a user-friendly software application. HIFIS was designed by and for shelters throughout the country to meet their administrative operating requirements while at the same time collecting information that will provide quality data on homeless shelter clients. Municipalities will also benefit greatly from the use of HIFIS. By identifying the number and characteristics of homeless people served in shelters in their jurisdiction, many municipalities will, for the first time, gain a basic understanding of the homeless population in their region. As a result, local governments will be able to better plan, monitor and evaluate policies and programs designed to reduce the problem of homelessness. The software is being pilot tested in 10 municipalities throughout Canada. HIFIS is aimed at assisting local agencies throughout the country.

CMHC Project Officer : *John Engeland*
Division : Research Division
AVAILABILITY : Publication is not available
CIDN : 2295 0200003
STATUS : Ongoing Project
NEW

HOUSING STABILITY AND MENTAL ILLNESS

The objective of this project is to evaluate the effectiveness of programs to promote housing stability for the mentally ill population at risk of homelessness. The research will look at a sample of programs and service providers in order to answer the question of which interventions and which factors most effectively help this population to access and, more importantly, maintain stable housing. Examples of housing-related interventions are supportive housing, residential care, support service agreements with private or social housing landlords, transitional housing, respite care, discharge planning, housing help and mediation services, and crisis response.

CMHC Project Officer : *Anna Lenk*
Division : Research Division
AVAILABILITY : Publication is not available
CIDN : 2290 0200
STATUS : Ongoing Project
NEW

REPORT ON A FEASIBILITY STUDY FOR A PILOT INFORMATION SYSTEM FOR CANADIAN SHELTERS FOR HOMELESS INDIVIDUALS AND FAMILIES

Following a conference on homelessness in June 1995, Canada Mortgage and Housing Corporation (CMHC) initiated a series of projects to test need and demand for a pilot information system for shelters for homeless individuals and families. The intent of the research was to develop such an information system, if needed and feasible. This report represents the second step in this work--a feasibility study on a pilot information system for shelters and an outline of possible information system specifications.

The feasibility study obtained assessments of need for an information system, and views as to how it could work, from organizations operating 62 shelters in cities in all regions of Canada.

The study results indicate that considerable interest exists in a shelter information system (90 per cent of shelters indicated that they felt shelters would benefit from an information system, and 63 per cent indicated that they would consider participation). The feasibility study results suggest that shelter interest in a national information system is substantial, widely based across Canada, and it is feasible to develop a pilot information system for shelters for homeless persons and individuals in Canada. The researchers recommend that such a system be developed, with strong shelter input at each stage as has been the case so far. Such a system would be used by participating shelters, with important uses for planning, advocacy and case management.

Prepared by SPR Associates Inc. CMHC Project Officer: John Engeland. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Distinct Housing Needs Series)

NOTE : Aussi disponible en français sous le titre : *Rapport sur une étude de faisabilité visant un système pilote d'information applicable aux centres d'hébergement canadiens pour personnes et familles sans-abri.*

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

ROUNDTABLES ON BEST PRACTICES ADDRESSING HOMELESSNESS: BACKGROUND REPORTS AND SUMMARIES

CMHC co-hosted five regional roundtables in April 1999 and a national roundtable in June 1999 on best practices addressing homelessness, using the "Best Practices Addressing Homelessness: Documentation" as a basis for discussion. The regional roundtables were co-hosted by CMHC and local homelessness organizations. The roundtables were effective opportunities for network building and exchange of information on effective best practices. A final document was prepared containing brief summaries of the six roundtables and "regional backgrounders" on key homelessness issues, prepared by the co-host homelessness organizations.

Ottawa: Canada Mortgage and Housing Corporation, c1999. (Distinct Housing Needs Series)

NOTE : Aussi disponible en français sous se titre : *Tables rondes sur les pratiques exemplaires d'intervention auprès des sans-abri.*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
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SERVICES FOR CHILDREN AND YOUTH IN CANADIAN SHELTERS FOR HOMELESS FAMILIES

This project will investigate the availability and viability of space allocations and services for youth and children in emergency family shelters (i.e., family units in homeless shelters, temporary and satellite shelters such as hotels, and shelters for victims of family violence).

CMHC Project Officer : *Gloria Neufeld Redekop*
CIDN : 2085 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

SURVEY OF CANADIANS' ATTITUDES TOWARD HOMELESSNESS

Questions were developed for inclusion on the June 1996, March 1997, March 1998 and March 2000 Environics Focus Canada surveys. The intent of the questions is to gauge the non-homeless population's general perception of the homeless population, the public's general awareness of homelessness, whether homelessness is a priority for Canadians, and the sense of responsibility Canadians feel toward persons in need. Results are published on the CMHC website.

CMHC Project Officer : *Anna Lenk*
CIDN : 2282 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : See above.
NEW

WOMEN ON THE ROUGH EDGE: A DECADE OF CHANGE FOR LONG-TERM HOMELESS WOMEN

There have been significant changes over the past decade in the profile of women's homelessness and the service context. The proportion of women who use the emergency shelter system in Toronto increased from 24 to 37 percent from 1988 to 1996. As more women become homeless and the existing social service and health system is less able to assist them, the most vulnerable stay homeless for longer periods.

This report constitutes a retrospective review of the changing patterns of women's homelessness in the Toronto area from 1987 to 1997, with a focus on conditions and services for long-term homeless women, based on the observations and expertise of those who have worked closely with homeless women over the previous decade. Interview data from a small number of homeless women are included, along with a research-based profile of long-term homelessness among women in Toronto.

The report discusses distinctions in shelter and other service use patterns among homeless women (i.e., transitional, episodic, and chronic homelessness) and implications for housing and support service requirements. Women who are homeless for long periods of time face similar circumstances as other homeless women except that their personal resources are fewer, their state of physical and mental health poorer, and their individual capacity to cope is weaker. They are very likely to have severe mental health problems, and it appears that the prevalence of addictions is increasing.

Prepared by Sylvia Novac, Joyce Brown, Gloria Gallant. CMHC Project Officer: Brenda Baxter. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

Note : Aussi disponible en français sous le titre : *Femmes en difficulté : une décennie de changements pour les femmes sans-abri à long terme*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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K1A 0P7
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HOUSE CONSTRUCTION INDUSTRY

HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY

This research project will examine the evolution of the structure of the housing industry in Canada since the mid-1980s, the industry's current and expected future challenges in the period to 2010, and the ways it might and should adapt. The study will also identify research issues which merit further investigation and study.

CMHC Project Officer : *Ian Melzer*

CIDN : 1987 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

HOUSING

CANADIAN HOUSING STATISTICS 1999 = STATISTIQUES DU LOGEMENT AU CANADA 1999

"Canadian Housing Statistics" is the definitive annual source book of current and historical information on housing. The publication is designed to bring together data relating to house-building and mortgage lending activity in Canada. Most of the data are derived from the operations of Canada Mortgage and Housing Corporation and from Statistics Canada. This comprehensive report places special emphasis on new housing construction, mortgage lending, construction costs and the demographics of housing demand.

Ottawa: Market Analysis Centre, Canada Mortgage and Housing Corporation, c2000.

Order number: 5958B **Price: $50.00 + GST and handling charges

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
700 Montreal Road
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ECONOMIC IMPACTS OF RESIDENTIAL CONSTRUCTION

This Research Highlight (Socio-economic Series Issue 69, forthcoming) examines the contribution of residential construction to output and employment growth in the Canadian economy, drawing upon four published CMHC studies:* Macroeconomic Impacts of the Housing Sector (Oct. 1997)* The Macroeconomic Impacts of Housing Construction Activity: Simulations with the FOCUS Model (March 1998)* The Economic Impacts of Ancillary Housing Expenditures (forthcoming), and* The Macroeconomic Impact of the Building Materials Industry in Canada (1999)

It finds that housing activity has a significant impact on output and employment in the Canadian economy. Expenditures on new residential construction or on renovations have significant direct, indirect and induced impacts on Gross Domestic Product and employment. Adding to the impacts of new construction, those from ancillary expenditures on activities such as land and infrastructure development and various related services (real estate, legal and financing), each newly constructed housing unit gives rise to approximately between 3 and 6 person-years of employment in total over a 5 year period.

***CMHC Project Officer** : Ian Melzer*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

NEW

FUTURE OF THE INTERNET AND THE HOUSING SECTOR

This study examines the extent of the usage of the Internet in the housing sector. It also briefly explains the Internet and its main features, the history of its general usage, growth worldwide and the opportunities it provides for the housing sector over the next few years. Trends associated with Internet usage are discussed for the following areas of the housing sector: housing construction; the real estate sector, housing financing and evaluation; governments and government agencies; industry associations and urban planning in general. The study provides a useful listing of housing-related Web sites in Canada and the United States in such areas as: institutional and government agencies; construction and architecture; real estate; financing and mortgage loans; planning and related specialties and co-operative housing.

Prepared by Syllable Internet Expressions Inc. Reviewed and supplemented by Florence Millerand. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series: Research Report)

Order number: PE0317

NOTE : Aussi disponible en français sous le titre : *Internet et le secteur de l'habitation de demain.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

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HOUSING AND POPULATION HEALTH: A REVIEW OF THE LITERATURE

This paper reviews the strength of evidence in the established literature that links housing to health, especially population health and comments on the state of the art.

The literature was screened for scientific robustness before the assessment. Two distinct categories of literature are apparent. The larger category has to do with chemical, biological and radiation exposures which occur primarily or frequently in the household setting. A smaller category has to do with sociological concepts and physical design. Overall, 24 housing exposures or factors were identified, leading to 40 health effects, about a quarter of them judged to be definitively or strongly linked.

All the definitive or strong links were found in the first category. Here, research methods come from the disciplines of environmental and occupational health and take place within an established theoretical framework involving quantitative exposure assessment, measurement of defined physiological parameters and health outcomes, and calculation of the dose-response relationship between exposure and outcome.

In the second category, research examines complex housing factors such as design and overcrowding that do not easily conform to an experimental model based on exposure to a physical substance. Socioeconomic status and its component parts were noted as a confounding variable which strongly influences both the health status of the individuals in a household and in the quality of their housing situation.

Generally, the research on the housing/health relationship has not established the relative importance of different housing factors nor looked at the interaction of factors. Methodological difficulties are associated with research which must span different types of disciplines.

There is a lack of a general theory of the mechanisms by which housing affects health. Population health research, while acknowledging the importance of the social and physical environment, rarely specifies housing. Very little attention has been paid to measuring how far, and in what way, better housing might improve public health.

Prepared by Centre for Applied Social Research, Faculty of Social Work, University of Toronto. Co-authors: Stephen Hwang . . . et al. CMHC Project Officer: Philip Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2000.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
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HOUSING IN CANADA (HIC) CD-ROM DATA BASE

CMHC is developing an electronic CD data base called Housing In Canada (HIC) which will provide housing interest groups with direct hands-on access to comprehensive data on households and housing conditions using CMHC's custom 1996 housing conditions indicators data derived from the 1996 Census and comparing it with data from the 1991 Census. The data base will enable groups to have the hands-on capability to examine how and why housing conditions are changing.

The bilingual software is to be made available in the form of 39 easily manageable CD-ROM disks; one for each province and territory, and one for each census metropolitan area (CMA). Each provincial/territorial CD-ROM will contain Canada level data on it to provide context for all analyses. Similarly, each CMA CD-ROM will contain two sets of all CMA average data for comparison; one set for the province in which the CMA is located and the other for all of Canada.

CMHC Project Officer : *John Engeland*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2126 0200002
STATUS : Ongoing Project

HOUSING, SOCIAL INEQUALITY AND POPULATION HEALTH IN VANCOUVER NEIGHBOURHOOD AREAS

This study is a cross-sectional, survey-based investigation of relationships between housing, social inequality and population health in 13 Vancouver neighbourhood areas. Based on a model of the 'social determinants of health', the research examines relationships between differences in housing suitability, affordability, tenure, type, satisfaction, meaning, and neighbourhood social character on the one hand, and individual health status on the other, while controlling for age, gender, income, and ethnicity differences.

The major objectives were: to investigate ways in which social relations concerning housing and home contribute to the social production of health for individuals and to investigate ways in which housing (esp. affordability) and people's homes could act as a nexus for the production and reproduction of unequal social relations and social inequalities in health status.

Prepared by James R. Dunn. CMHC Project Officer: Philip Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Report) 84 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
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HOUSING

SPECIAL STUDIES ON 1996 CENSUS DATA

This project is composed of developing a series of concise studies that explore the housing conditions reported in the 1996 Census of Canada. Five studies are currently completed and available on the CMHC web site: Research Highlights Issue 55-1 Canadian Housing Conditions uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households. Research Highlights Issue 55-2 Housing Conditions in Metropolitan Areas examines Canada's 25 Census Metropolitan Areas. Research Highlights Issue 55-3 Housing Conditions of Immigrants discusses the housing conditions of households whose primary maintainer is an immigrant to Canada. Research Highlights Issue 55-4 Housing Canada's Children examines the housing environment of Canada's children. Research Highlights Issue 55-5 Changes in Canadian Housing Conditions, 1991-96 examines changes in the housing conditions of non-farm, non-Native households between the 1991 and 1996 Censuses. Subsequent studies are planned to examine smaller groupings of interest, such as: Aboriginal people; seniors; people who live alone; families; tenants; women; young people.

CMHC Project Officer : *Ian Melzer*
Division : Research Division
AVAILABILITY : See above

CIDN : 1988 0200003
STATUS : Ongoing Project

HOUSING AFFORDABILITY

ACT REGIONAL STAKEHOLDER INFORMATION SESSIONS

At least 10 information sessions will be held across Canada to inform housing stakeholders of regulatory reform solutions that have been generated under the Affordability and Choice Today program. The intent is to encourage replication of these solutions. Stakeholders will include municipalities, home builders, non-profit housing groups and other housing specialists.

CMHC Project Officer : *Susan Fisher*
AVAILABILITY : Publication is not available

Division : Research Division
STATUS : Ongoing Project
NEW

AFFORDABLE HOUSING ADVISOR

This project will assemble an electronic database of strategies that have been successfully used to improve housing affordability. These strategies will appear under categories of activity such as: Policy and Regulation; Housing and Community Design; Financing and Tenure; Construction and Technology; Operations and Management; and Redevelopment. Each strategy will be explained and illustrated with two example projects. The database will be accessible through the CMHC web site and will be fully searchable and linked to relevant sources of information of the strategies and examples. The sources will include CMHC reports, publications by other organizations and individuals and web sites of public, non-profit and non-government organizations. This database would be a virtual encyclopedia on affordable housing tools.

CMHC Project Officer : *Fanis Grammenos*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2053 0200004
STATUS : Ongoing Project
NEW

AFFORDABLE HOUSING SOLUTIONS: FIFTEEN SUCCESSFUL PROJECTS

The project documented innovative approaches and 'best practices' for creating affordable housing from the Canadian non-profit and municipal housing sector. Fifteen case studies provide considerable detail on the strategies and means that were used by each of the groups to create affordable housing units. These involve new ideas in tenure such as Life lease, condominium, equity ownership and co-housing and also new ideas in financing such as partnerships, land leases, fundraising and others. All are explained in detail with specific project financing and client data. The reasons for success are listed and contacts with the lead organizations are given. The information in the report would be valuable to groups and organizations who provide or deliver affordable housing such as: housing cooperatives, non-profit organizations, charitable organizations, and municipal and provincial housing agencies.

Prepared by Deborah Kraus, Margaret Eberle, Joffre Pomerleau. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, c1999. (Housing Affordability and Finance Series Research Report) 125 pages

Order number: PE 0363

NOTE : Aussi disponible en français sous le titre : *Solutions de logements abordables* : *quinze modèles de réussite*

STATUS : New Completed Report
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ALTERNATE TENURE ARRANGEMENTS

The objectives of this research were:

1. To develop a report on the range and types of alternate tenure arrangements that are currently available in Canada; and

2. To assess the extent to which housing projects using various types of alternate tenure arrangements are meeting residents' needs, preferences, and expectations.

The research included reviewing current literature on the range of alternate tenure arrangements that are available in Canada and carrying out 30 case studies of housing projects across Canada featuring various types of alternate tenure arrangements. The case study research involved visits to each of the projects, in-depth interviews with the project administrators and sponsors, and interviews with residents.

This report presents the results of this research and discusses and compares the various types of alternate tenure arrangements that are currently available in Canada. These include life leases, equity co-ops, leaseholds, and shared equity arrangements. The report also includes a discussion of cohousing, which is a newly emerging form of collaborative housing that can feature a variety of tenure types.

Prepared by Kathleen Mancer Consulting, DSI Tandem Coop Resources, Langlois et associés. CMHC Project Officer: David Scherlowski. Ottawa: Canada Mortgage and Housing Corporation, 2000.

STATUS : New Completed Report
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BACKGROUND RESEARCH ON PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING

This research project is aimed at providing sponsors of affordable housing with a detailed situational analysis background overview of the philanthropic sector. The study includes an overview of the financial economics associated with producing affordable housing in Canada; an examination of the charitable sector and donor community; and a look at the tax implications of donations to charities and non profit organizations.

The report describes the nature, characteristics and regional variations in charitable giving in Canada; sources of charitable donations and funding levels as well as alternative fund raising methods used to solicit financial support. This component of the research also provides an overview of the nature, size and characteristics of the donor community in Canada and presents practical insights into the size, nature, geographic distribution and related factors impacting donations from individual Canadians, the corporate community and foundations. Sixteen case studies are used to illustrate how affordable housing sponsors have been able to obtain philanthropic support for creating affordable housing projects

CMHC Project Officer : *David Metzak*
CIDN : 2073 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

GUIDE TO AFFORDABLE HOUSING PARTNERSHIPS

Today, partnerships have become more and more common in both the private and public sectors as a way of stretching limited resources and achieving strategic objectives. To help you work with other individuals and organizations to address housing needs in your community, Canada Mortgage and Housing Corporation has developed this guide. This guide is intended for individuals and organizations in the non-profit, public and private sectors who have an interest in providing affordable housing for families, single persons, seniors and people with disabilities.

A partnership in housing is an arrangement between two or more parties who agree to work together to achieve shared or complementary housing objectives. Partnerships in housing can be applied at different stages in the life cycle of housing creation - asset creation, maintenance or renewal. They may also be formed to solve housing problems and issues through program and policy development. Partnerships vary in their duration and in their level of formality. Partnerships in housing, except under federal and provincial housing programs, are a relatively new way of delivering housing in Canada. Nevertheless, an impressive number of initiatives have been undertaken or are currently underway. Examples of partnership approaches are given throughout the guide to help you gain a better understanding of the partnership process and how it can be applied to the provision of affordable housing.

Prepared by the consulting team of Linda Lapointe of Lapointe Consulting Inc., Lauren Millier and Greg Spafford of PricewaterhouseCoopers and Luba Serge. Ottawa: Canada Mortgage and Housing Corporation, 1999, c1998.

Order number: NE2216 **Price: $19.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Guide des partenariats de logement abordable.*

STATUS : Completed Report
AVAILABILITY : CMHC Information Products
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1-800-668-2642
Fax orders from Canada: 1-800-245-9274
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GUIDE TO CREATING HOUSING TRUST FUNDS IN CANADA

This publication is a "how to" guide for those interested in establishing a housing trust fund (HTF). It provides advice on such topics as: making the first steps towards organizing to create a HTF; developing a proposal that addresses the potential administrative structure, funding priorities and revenue sources for the HTF; and, running a successful campaign to secure that finding source.

Prepared by Mary E. Brooks, Housing Trust Fund Project, Center for Community Change. Prepared in conjunction with Richard Drdla of Richard Drdla & Associates. Prepared for Canada Mortgage and Housing Corporation, Research Division CMHC Project Officer: David Scherlowski. Ottawa: CMHC, c2000. (Housing Affordability and Finance Series; Research Report) v, 36 pages.

Order Number: PE0407

NOTE : Aussi disponible en français sous le titre : *Guide pour la création de fonds fiduciaires pour le logement au Canada.*

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
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GUIDE TO DEVELOPING A MUNICIPAL AFFORDABLE HOUSING STRATEGY

The objective of this study is to develop a guide on how to design, implement and monitor a municipal affordable housing strategy, including information on the range of instruments that could be included in such a strategy. The project team will undertake the following key tasks to ensure the guide is of greatest use to its intended users, municipalities, including: 1. a literature and Internet search on municipal housing strategies and housing policy tools; 2. a national scan of provincial officials and non-governmental organizations and consultations with municipalities with experience in conducting an affordable housing strategy; 3. consultations with municipalities that do not have a housing strategy but who are willing to work with the consultants to ensure that the guide addresses practitioners's needs; and 4. consultations with local community and non-profit housing developers and affordable housing sponsors.

CMHC Project Officer : *David Metzak*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2274 0200001

STATUS : Ongoing Project

NEW

HOUSING TRUST FUNDS: THEIR NATURE, APPLICABILITY AND POTENTIAL IN CANADA

A housing trust fund is essentially a locally-based organization that has secured a dedicated source of on-going revenue that is committed to the production and preservation of housing affordable to lower-income households.

This report examines the character and role of housing trust funds (HTFs) in the United States and their potential and applicability in Canada. It is presented in a number of parts: a review of the conditions in the U.S. that led to the establishment of HTFs; a summary of the recent American experience with HTFs, including discussion on funding sources, administrative structures and other key features; and, a number of profiles of particular HTFs in both countries that describe in greater detail their origins, sources of funding, administration and accomplishments to date.

U.S. housing trust funds profiled in the report include: the State Housing Initiative Program (Florida); Missouri Housing Trust Fund; Neighbourhood Housing Trust (Boston); Housing Trust Fund (Berkeley); Community Housing Trust Funds (Santa Fe); and, Community Housing Assistance Program (Boulder). Similar Canadian funds which are profiled include: Housing Reserve Fund (Saskatoon); Affordable Housing Fund (Vancouver); Employee Housing Service Charge Fund (Whistler); Reserve Fund for Affordable Housing (Banff); Housing Opportunity Partnership Loan Fund (Winnipeg). Proposed housing trust funds for Montreal, New Brunswick and Edmonton are also profiled.

Prepared by Richard Drdla Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Scherlowski. Ottawa: CMHC, c2000. (Housing Affordability and Finance Series; Research Report) 100 pages.

Order number: PE0376

NOTE : Aussi disponible en français sous le titre : *Fonds fiduciaires pour le logement: nature, applicabilité et potentiel au Canada*

STATUS : New Completed Report

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MUNICIPAL PLANNING FOR AFFORDABLE HOUSING

The purpose of this report is to better inform the housing and planning community of the land use planning and associated financial measures that can be used during the development approval process to bring about new affordable housing. These are: alternative development standards; density bonusing; inclusionary zoning; performance based planning and other flexible planning approaches; linkage programs; and, development cost charges on a unit size basis. A thorough description of each of the six measures is provided, focusing on their impacts on affordability. The study also describes some of the potential linkages among the measures and places them in the larger planning context. This final research report will be of interest to planners, municipal and provincial housing analysts, finance officers, and third sector housing providers.

Prepared by Ray Tomalty, Anna Hercz, and Peter Spurr. CMHC Project Officer: David Scherlowski, Ottawa: Canada Mortgage and Housing Corporation, 2000.

STATUS : New Completed Report

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Canada Mortgage and Housing Corporation
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MUNICIPAL REGULATORY INITIATIVES: PROVIDING FOR AFFORDABLE HOUSING

This report examines three types of regulatory initiatives used by municipalities to provide for affordable housing. These consist of inclusionary zoning, a variety of exaction programs including linkage fees, and density bonusing -- also known as incentive zoning in many places.

All these initiatives rely on the development approval process to encourage, enable or require for-profit developers in some way to provide for housing affordable specifically to lower-income households. While only used to a limited extent in Canada, they have been increasingly used across the United States since cutbacks to federal funding in the early 1980s.

This report is intended to make the opportunities offered by these initiatives more widely known to local housing officials and others involved in the development of affordable housing in Canada.

The recent experience with these initiatives in both countries is reviewed, drawing upon both published and municipal reports as well as extensive telephone interviews. The findings are presented mainly through an overview of the three types of initiatives and profiles of two dozen of the most important of representative examples.

Prepared by Richard Drdla Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project officer: David Scherlowski. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0326

NOTE : Aussi disponible en français sous le titre : *Initiatives de réglementation municipales : production de logements abordables.*

STATUS : Completed Report

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REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS

The purpose of this project is to undertake a study to refine CMHC housing affordability indicators.

CMHC Project Officer : *Louis Trottier*
Division : Market Analysis Centre
AVAILABILITY : Publication is not available

CIDN : 2320 1000001
STATUS : Ongoing Project
NEW

RESEARCH ON AN IMPROVED MEASURE OF AFFORDABILITY FOR ESTIMATING HOUSING NEED IN CANADA

This study was undertaken to assist the Federal/Provincial/Territorial Partners in their review of the standard for housing affordability used in estimating Core Housing Need. Specifically, the report examines whether there is an alternative measure that better approximates housing affordability needs across the country than the current fixed 30-percent Shelter Cost-to-Income Ratio (STIR).

The study was comprised of three major components:

- Examining the fixed 20-percent STIR norm in relation to actual shelter spending patterns;
- Exploring alternative variable-STIR measures which aim to treat households with differing circumstances more equitably than is the case under a fixed STIR; and
- Estimating the number of households in need under the alternative approaches.

Prepared by Clayton Research Associates Limited in association with Fuller Information. Prepared for John Engeland, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1997. (Housing Affordability and Finance Series: Research Report)

Order No. PEO311

NOTE : Aussi disponible en français sous le titre : *Recherche sur une mesure améliorée de l'abordabilité pour estimer les besoins de logement au Canada.*

STATUS : Completed Report
AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

ROLE OF PUBLIC-PRIVATE PARTNERSHIPS IN PRODUCING AFFORDABLE HOUSING: ASSESSMENT OF THE U.S. EXPERIENCE AND LESSONS FOR CANADA

This report examines how public-private partnerships (PPPs) have emerged in the United States as a delivery vehicle for the provision of affordable housing.

The report first reviews the historical factors and circumstances that bred the PPP system. This evolutionary period is contrasted with the conditions that prevailed in Canada. Part 1 briefly reviews and presents a conceptual framework to describe the range of mechanisms and measures that are used to patch together affordable housing.

Part 2 then introduces and reviews a set of illustrative case studies that were used to examine, in greater detail, how affordable housing projects and partnerships are structured and packaged in the United States. The key features of affordable housing projects and PPPs are highlighted.

Part 3 provides a brief overview of the Canadian context and reviews a smaller set of Canadian case studies. The experience in each country is juxtaposed as a way to help understand the differences that exist and the potential of some of the U.S. approaches to be adapted to fill voids in the Canadian system.

An overall assessment of the U.S. experience and the opportunities to expand the production of affordable housing in Canada through PPPs are the subject of Part 4.

Three detailed appendixes contain, respectively, greater detail on the mechanisms, measures and roles of key partners (Appendix A); profiles of the 15 U.S. case studies (Appendix B); and profiles of the seven Canadian case studies (Appendix C).

Prepared by Steve Pomeroy, Focus Consulting and Greg Lampert, Economic Consultant, in association with James Wallace, Abt Associates, and Robert Sheehan, Regis J. Sheehan and Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: David Metzak. Ottawa: CMHC, 1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0318

NOTE : Aussi disponible en français sous le titre : *Le rôle des Partenariats Publics-Privés dans la production de logements abordables : Évaluation de l'expérience Américaine et leçons à tirer pour le Canada PF0318.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

STATE AND PROVINCIAL AFFORDABLE HOUSING MEASURES

The objective of this project is to identify and describe affordable housing measures being used by various states in the U.S. and provinces in Canada which essentially oblige their municipalities to use the regulations associated with the development approval process, but without financial subsidies, to encourage the private sector to provide affordable housing. The final report will be of interest to provincial and municipal planners, housing analysts, finance officers, and third sector housing providers.

CMHC Project Officer : *David Metzak*

CIDN : 1670 0200003

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

HOUSING AND IMMIGRATION

ETHNICITY AND CULTURE IN TENANT PARTICIPATION: AN ASSISTED HOUSING COMMUNITY IN TORONTO

This case study looks at possible barriers to community participation that are specifically related to cultural and ethno-racial diversity and suggests strategies that have the potential to enhance participation. The setting for the study is a government assisted housing project in Toronto where the residents include a large number of immigrant families from many different cultural backgrounds.

The study showed that most barriers to participation were linked to: a lack of knowledge about rights in the community, a perception that meetings were not effective and that nothing would be done, feelings of isolation, and lack of confidence especially among newer or smaller groups. However, these factors were not specific to any particular ethnic group and were not directly related to diversity. Some barriers which did have their origins in diversity were also noted.

The study concluded that, by and large, the main barriers resulted from different expectations among the actors (the residents' cultural groups, management, staff and youth) and the way an expectation of any one actor is perceived by the others. There were also many straightforward actions that could be taken that would help close the gaps in expectations, and that these could be combined into five strategic approaches centred on: meetings, information dissemination, relationship building, involvement of cultural groups, and involvement of youth.

Prepared by Irene Pereira. Ottawa: Canada Mortgage and Housing Corporation, 1998.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues, through a network of research centres in Canadian universities. Information on Metropolis and on the almost 200 funded research projects can be found at <canada.metropolis.net>.

CMHC Project Officer : *Tom Kerwin*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2224 0200001
STATUS : Ongoing Project

NEWCOMERS' GUIDE TO CANADIAN HOUSING

This guide is designed to answer newcomers' questions about renting or buying a house. It provides information about housing in Canada, sets out the nature and types of questions to ask landlords, building superintendents, real estate sales representatives, property managers and lenders and explains mortgages, interest, and the steps in buying a house, as well as the process of acquiring rental accommodation.

Ottawa: Canada Mortgage and Housing Corporation, c1999. (Housing Affordability and Finance Series)

NOTE : Aussi disponible en français sous le titre : *Le Guide du logement au Canada pour le nouvel arrivant*

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

NOTE: Copy available free from CMHC's web site:
http://www.cmhc-schl.gc.ca/publications/en/online1.html#newcomer
ftp://ftp.cmhc-schl.gc.ca/rd-dr/en/ah-la/newcomer.pdf

HOUSING AND IMMIGRATION

STUDY ON THE RESIDENTIAL INTEGRATION OF IMMIGRANT YOUTH IN MONTRÉAL

The purpose of this project is to find solutions to the problem of integratng immigrant youth in Montréal.

CMHC Project Officer : *Tom Kerwin*	***CIDN*** : 2316 0200001
Division : Research Division	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	***NEW***

HOUSING EXPORT OPPORTUNITIES

ADAPTING CANADIAN HOUSING TECHNOLOGY TO INTERNATIONAL MARKETS: DESIGN, MATERIALS, COMPONENTS AND STRUCTURES

Canada has one of the most diverse and successful housing industries in the world. Operating from this solid base, hundreds of companies with housing-related products, technologies and systems to offer are operating in foreign markets. Many are looking actively for additional export and investment opportunities abroad. To succeed, they pay attention to differences from Canadian norms in national and local standards, cultural traditions, design and quality expectations.

This report answers three main questions: do buyers in foreign housing markets accept what Canadian firms have "off the shelf" at present?; how are Canadian exporters already adapting to specific requirements of foreign customers?; and what future opportunities exist to increase market share by adapting housing-related products, technologies and services?

Based on Statistics Canada export data, many Canadian housing-related materials and products already enjoy widespread acceptance in many foreign markets. Exporters assure buyers of the quality of goods through a variety of means, and also compete effectively on price, availability, and timeliness of delivery. Nevertheless, significant opportunities remain to expand market share through adaptation to local taste, conditions and standards.

Experienced housing exporters are already strongly committed to and acting on the idea of adapting what they sell in foreign markets. They alter design, colour, finishing, quality, performance, dimensions, language of literature or other features, in some cases substantially. However, more needs to be done to facilitate exchanges of practical information on this topic among current and prospective exporters, resulting in significant gains in Canadian export success. Against Canada's very able competitors in international housing markets, every marketing tool that can be created for Canadian firms is needed. Advantages to be gained over other Canadian firms by clutching best practices in many foreign markets are fleeting, if they exist at all. While there are obviously some proprietary technologies and products and commercial-confidential "tricks of the trade", most product and service adaptations are readily evident from published company literature. The potential market is often so vast that there is plenty of room for everyone from Canada, despite possible perceptions to the contrary.

HOUSING EXPORT OPPORTUNITIES

Foreign private sector partners and government research institutes are increasingly likely to become partners in "co-evolving" a version of Canadian housing technology to meet their own circumstances and needs in future. However, this approach to adaptation must be approached with care, so as to avoid difficulties caused in Japan, for example, where Canada is more noted as a source of quality, competitively-priced lumber, than as a supplier of quality whole-house systems.

Certain Canadian companies focus on products, technologies and services specifically suited to international markets alone, mainly for "low cost" housing. With a few exceptions, the latter appear to be having only modest success at present. The most productive avenue for the future may lie in the direction of investing in local ventures and technology transfer rather than exports as such.

The report concludes with handy lists of key questions for potential use by Canadian companies exploring entry into new international markets or seeking to increase market share. These take the user through an issue-by-issue or element-by-element review of potential adaptation requirements and considerations.

The report also contains contract information for experts in the field, and references for additional reading.

Prepared by C. David Crenna, The Bayswater Consulting Group Inc. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

ARE YOU READY TO EXPORT?

This guide deals primarily with exporting, more precisely, it will help you determine whether you are export-ready and will assist in identifying areas of strengths and weaknesses. The guide explains the three critical issues for anyone starting out in the export business:1. Doing business at a distance;2. Doing business in a different environment;3. Dealing with risk.Chapters cover export readiness criteria; dealing with export related risks; choosing a target market and evaluating your export readiness through a self-evaluation tool.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 50 pages

NOTE : Aussi disponible en français sous le titre : *Êtes-vous prêt à exporter?*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 50 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

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Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

BUSINESS GUIDE TO GERMANY FOR THE CANADIAN HOUSING INDUSTRY

This guide had been developed to help the Canadian housing industry do business in Germany. The guide covers many topics to help a variety of Canadian housing-related firms. The guide is divided into two parts. The first part focuses on market entry considerations. The second part describes all pertinent information in detail under major delivery factors: product qualification and certification; building regulations and building permits; access to property; construction workers; financing; German companies and taxation; the German customer; technology and know-how; marketing practices of housing manufacturers; and export logistics. An appendix provides addresses of prefabricated house manufacturers.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c2000. 62 pages

NOTE : Aussi disponible en français sous le titre: *Guide destiné aux entreprises canadiennes faisant affaire en Allemagne*

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

CHARACTERISTICS OF SUCCESSFUL HOUSING ALLIANCES

The purpose of this project was to document the successful characteristics and criteria that generally applied to any Canadian housing company wishing to export housing. This research was carried out in an effort to help companies enhance their success at exporting Canadian housing expertise. The report defines the characteristics of effective alliances and provides information on the following characteristics for success:

1. Ability to find financing; 2. Good people skills; 3. Competitiveness; 4. Networked market development.

The list of participants interviewed and copies of the survey instruments used are included in the report.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, c1999.

STATUS : New Completed Report

AVAILABILITY : On a loan basis only from:
Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
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CHINA HOUSING NEEDS SURVEY

The purpose of this project is to conduct the China Housing Needs Survey to determine the current and future housing needs of Canadian companies present in China, and to determine Canadian companies interested in locating staff in Canadian supplied housing

CMHC Project Officer : *Marion A Rasmussen* **Division :** Canadian Housing Export Centre

AVAILABILITY : Publication will not be published **STATUS :** Ongoing Project

CODES AND STANDARDS PROPOSAL TO GERMANY

This project's objective is to develop and implement a strategy and action plan for a proposal to be made to German authorities to improve access to the German housing market for the Canadian housing system.

CMHC Project Officer : *Louis Musto* **CIDN :** 1809 0900001

Division : Canadian Housing Export Centre **STATUS :** Ongoing Project

AVAILABILITY : Publication will not be published

CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS

The objective of this project is to study the Pacific Rim markets for termite-resistant wood products.

CMHC Project Officer : *Jay Thakar* **CIDN :** 2104 0900001

Division : Canadian Housing Export Centre **STATUS :** Ongoing Project

AVAILABILITY : Publication will not be published

DEVELOPMENT OF A CANADA BRAND INITIATIVE AND QUALITY ASSURANCE PROCEDURE FOR GERMANY

The purpose of this project is to develop specifications and procedure for an appropriate quality assurance program that will meet the requirements of the German DIBt systems approval, and to develop a 'Canada Brand' house initiative for the German market.

CMHC Project Officer : *Louis Musto*	***CIDN*** : 1550 0900004
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication will not be published	***NEW***

DEVELOPMENT OF A FRAMEWORK FOR CODES, STANDARDS AND CERTIFICATION FOR THE USE OF CANADIAN HOUSING TECHNOLOGY AND PRODUCTS IN RUSSIA

The purpose of this project is to provide a standard base for family house building development, including row houses, in the cities of the Russian Federation in accordance with the main directions of the 'Zhilische' housing program.

CMHC Project Officer : *Anjela Pavlova*	***CIDN*** : 2145 0900001
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication will not be published	

DEVELOPMENT OF CURRICULUM MATERIALS FOR TRAINING IN ASPECTS OF MORTGAGE LENDING

The purpose of this project is to prepare curriculum material for a one and a half day training program on components of the residential mortgage lending system in Canada, for international audiences unfamiliar with mortgage lending, etc.

CMHC Project Officer : *Anjela Pavlova*	***CIDN*** : 2261 0900002
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication will not be published	

DOCUMENTING EXPORT FINANCING

This booklet is for the new housing exporter who is approaching a bank to finance an export transaction. You have a wonderful idea for an export project, you make an appointment with the bank, show the loans officer your product sheets, explain the export potential, yet the bank turns you down flat - because your company and the project were not well documented. This guide will help you with the preparation of both the application for financing, and the various financial instruments, with their accompanying export documents.

It is intended primarily for small to medium-sized housing product manufacturers who want to prepare the necessary documents on their company and export project for a lender and carry the transaction through to a successful conclusion.

Chapters 1-4 describe what you should look for in a lender, and what the lenders are looking for in your company and project; then provides a step by step outline of an Export Business Plan, an Export Financing Proposal and the major supporting documents with examples. This is followed by an outline of financing sources.

Chapters 5-7 begin by describing the methods of payment you can negotiate, with particular emphasis on documentary letters of credit (L/Cs)a short chapter on the Incoterms, and an outline of the shipping and other documents that must accompany the L/C.

The guide ends with a select annotated bibliography, a list of Internet resources and a glossary of export and documentary credit terms.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 94 pages

NOTE : Aussi disponible en français sous le titre : *Documentation financière en vue de l'exportation*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 94 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

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Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

EARTHQUAKE RESISTANT MODULAR HOME FOUNDATION SYSTEM

While Canadian manufacturers hold a significant share of the Japanese import housing market, they face increasing competition. One response is to introduce improved products which respond to Japanese technical and lifestyle concerns. This report explores such an approach involving improved earthquake resistant foundations which go beyond normal structural 'life-safety' protection to include 'continuing functional livability'.

The original hope had been to reconfigure the typical crawl space foundations to create a sliding slab arrangement whereby modular, panelized or conventional Japanese 2x4 export homes could "float" during an earthquake. However, this proved to be impractical.

The work then considered a variety of alternate strategies before adopting ground isolation utilizing seismic sliders. However, it proved necessary to introduce 200 mm thick pre-cast concrete slabs between the modules and sliders to preclude the light home from moving under Japan's design wind loads. The proposed designs were subjected to computer simulations of the 1994, Northridge; 1995, Kobe; and the 1977 San Fernando quakes. In all instances, the homes met the required earthquake resistance criteria.

Work also considered residential service connections, porches, steps and overhangs such as carport plus a potential closure system at the base of the home. Finally the concept was considered within the context of three-storey, wood-framed apartment buildings.

Costing analysis indicates that an earthquake resistant house foundation is roughly twice the cost of a conventional foundation, but adds only 3% -3.5% to the cost of a typical Japanese home while providing considerably higher protection. More importantly, an earthquake resistant foundation system actually appears less expensive than traditional non-protective foundations for wood-framed apartment buildings.

The work concludes with an analysis of the further research required to conclusively demonstrate the effectiveness of the seismic resistant foundation system in a modular home setting to an acceptable engineering certainty.

Prepared by B. Ian Bazley, Carlos E. Ventura and Jachym Rudolf. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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International clients see page 9 for order instructions.

ESTABLISHING POLAND REAL ESTATE FUND

The purpose of this project is to assess the feasibility of establishing a Poland Real Estate Fund.

CMHC Project Officer : *Mietka Zieba* — ***CIDN*** : 2205 0900001

Division : Canadian Housing Export Centre — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication will not be published

EVALUATION OF CODES, REGULATIONS, DESIGN & BUILDING METHODS IN PRIORITY MARKETS (USA, RUSSIA, SOUTH KOREA, CHILE)

The purpose of this project is to undertake an evaluation of codes, regulations, design, builidng methods and cost analysis of the building materials in the countries of Chile, Russia, South Korea and the United States.

CMHC Project Officer : *Mark Holzman* — ***CIDN*** : 1949 0200002 (USA)

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

EXPORT PERFORMANCE AND NEEDS OF THE CANADIAN MANUFACTURED HOUSING INDUSTRY

The objective of this research is to develop a statistical profile and to identify the export performance and needs of the Canadian manufactured housing industry.

CMHC Project Officer : *Louis Musto* — ***CIDN*** : 1909 0900001

Division : Canadian Housing Export Centre — ***STATUS*** : Completed Report

AVAILABILITY : Canadian Housing Export Centre

FEASIBILITY STUDY ON AFTER-SALES SERVICES AND ESTABLISHMENT OF A WAREHOUSE FOR CANADIAN HOUSING EXPORTS IN JAPAN

The objectives of this project are to identify existing programs for after-sales services; to provide options for after-sales services; to study Japanese laws and regulations governing the establishment of a warehousing facility in Japan by a foreign company; and to do a cost-benefit analysis for the recommended option.

CMHC Project Officer : *Jay Thakar*
CIDN : 2056 0900001
Division : Canadian Housing Export Centre
STATUS : Completed
AVAILABILITY : Publication will not be published

GETTING READY TO EXPORT

This guide deals primarily with direct exporting. More precisely, if you have identified your areas of strengths and weaknesses, it will guide you through the major steps necessary to improve your direct export readiness. Chapters 1 and 2 include a brief review of doing business abroad and your export readiness rating. Chapter 4 covers choosing between three possible objectives: survival, growth, or profit. Chapter 5 deals with the selection of a target market, while Chapter 6 covers the basic tools of the export trade. In Chapter 7, you will learn about overseas agents and in Chapter 8 the actual preparation of an export plan is covered. The remaining chapters ensure that you are prepared to do business and that you are "export-ready" for your first export business trip.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 115 pages

NOTE : Aussi disponible en français sous le titre : *Comment vous préparer à l'exportation*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 115 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

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International clients see page 9 for order instructions

GROWING OVERSEAS THROUGH LICENSING AND FRANCHISING

There are four basic steps to doing business abroad: direct exporting; licensing and franchising; strategic alliances; and wholly owned subsidiaries. This guide is an introduction to international licensing and franchising and covers the following topics:-- Intellectual Property;-- What is Licensing?-- What is Franchising?-- International Licensing and Franchising Guidelines--Expanding Overseas Through Licensing and Franchising. It includes templates for license and franchise agreements and the main components of a franchise operating manual. The guide concludes with a list of useful references.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 88 pages.

NOTE : Aussi disponible en français sous le titre : *Comment développer votre marché à l'étranger au moyen de licences et de franchises*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 88 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

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Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

GROWING OVERSEAS THROUGH STRATEGIC ALLIANCES AND SUBSIDIARIES

This guide for the new housing exporter is an introduction to overseas alliances and subsidiaries. Its focus is on how to establish a direct, permanent presence in the overseas market. The first section of the guide explains that all alliances are not the same, describes various types of alliances, and outlines problems that can arise with alliances. The second section of the guide helps exporters prepare in advance for a strategic alliance. Part 1 of this section focuses on what should be done to be prepared ahead of time and covers patents, trademarks, copyrights, industrial designs, trade secrets, etc. Part 2 deals with how to negotiate from a position of strength and outlines some negotiating do's and don'ts. The guide concludes with a section on how to treat the alliance as a valued customer and with a chapter of useful references.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 70 pages.

NOTE : Aussi disponible en français sous le titre : *Comment développer votre marché à l'étranger au moyen d'alliances stratégiques et des filiales*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 70 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

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HOUSING MARKET IN THE UKRAINE AND MARKETABILITY OF WESTERN CANADIAN CONSTRUCTION PRODUCTS IN THE UKRAINE

The purpose of this project is to assess the housing market in the Ukraine and to research the marketability of western canadian construction products in the Ukraine.

CMHC Project Officer : *Mietka Zieba*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication will not be published
CIDN : 2179 0900001
STATUS : Ongoing Project

HOUSING MARKET INTELLIGENCE STUDY OF JAPAN

Japan is one of the world's largest housing markets - housing starts averaged 1.5 million dwelling units annually during 1994-1997 period. This level of annual Japanese housing starts exceeds that of the United States over the same period (1.4 million) and dwarfs the 134,000 average annual starts in Canada.

Much of the market for housing products and services in Japan relates to the construction of single-family housing, which comprises roughly half of the country's total annual housing starts. Many countries including Canada are aggressively targeting Japan as a market for housing-related exports.

Access to market information and research expertise represents an important barrier to Canadian housing firms that are seeking to explore export opportunities in Japan.

This report comprises Phase 1 of a two-phase attempt to assist in this regard. Commissioned by the Canadian Housing Export Centre (CHEC) within Canada Mortgage and Housing Corporation (CMHC), the report highlights the availability, sources and quality of housing market information in Japan. The intent is to inform the Canadian housing industry about how to access important information on the Japanese market.

The Phase 2 study will provide an analysis of prospects for Canadian exports and an analysis of the penetration of imports into this market.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1999.

NOTE : Aussi disponible en français sous le titre : *Informations sur le marché de l'habitation au Japon.*

STATUS : Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 47 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

INDIA MARKET STUDY

The objective of this project is to study the market for Canadian housing industry in India, i.e. manufacturers of products related to housing, prefabricated housing, on-site builders and renovators, and professional services.

CMHC Project Officer : *Jay Thakar*

CIDN : 2049 0900001

Division : Canadian Housing Export Centre

STATUS : Completed Report

AVAILABILITY : Publication will not be published

INTERNATIONAL DISASTER HOUSING RESPONSE FOR CMHC

The objective of this project was to provide CMHC with a better understanding of the issues relating to Canada's responses, role and responsibilities, capacity and 'starting options' in the areas of long-term post-disaster and post-conflict housing and reconstruction requirements in foreign markets.

CMHC Project Officer : *Jeremy Melhuish* **CIDN** : 2270 0900001
Division : Canadian Housing Export Centre ***STATUS*** : Completed
AVAILABILITY : Publication will not be published

INTERNATIONAL FINANCIAL INSTITUTION (IFI) PROCUREMENT

This guide is for the small to medium-sized housing exporter (SME) who is interested in selling products or services to projects funded by the six International Financial Institutions (IFIs) in developing countries. Canadian housing product manufacturers have not been getting their fair share of goods and services procurement in this important market. This guide is intended to help chart a path to greater IFI procurement success for Canada's new housing exporters.

Chapter 1 describes the IFIs and what they do. Chapter 2 outlines Canada's track record in IFI procurement and some advantages to entering the market. In Chapter 3 the IFI project cycle and procurement process are described, while Chapter 4 outlines the bidding process and how to survive it. Chapter 5 describes several large IFI projects, then outlines some procurement announcements and contract awards to show how the IFIs operate. Chapter 6 sets out where the government assistance is - the IFI Procurement Specialist Network, a recent initiative. Chapter 7 discusses the recommendations of the Task Force on IFI Procurement. Chapter 8 contains a detailed checklist for firms interested in bidding on IFI-supported projects. Chapter 9 outlines the banks' procurement procedures. Chapters listing key contacts, addresses and Internet sites as well as Glossary and Bibliography complete the guide.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 59 pages

NOTE : Aussi disponible en français sous le titre : *Comment traiter avec les institutions financières internationales*

STATUS : New Completed Report
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INTERNATIONALISATION DE LA FILIÈRE HABITATION: UNE ANALYSE PERCEPTUELLE

In the rush of the global trade, an increasing number of Canadians firms are looking to foreign markets, and the housing industry is no exception. As domestic demand is down over previous years, prospecting new markets outside the country, is an avenue firms are increasingly less hesitant to explore. To date, however, the housing industry does not have its rightful share of exports, given its size in the Canadian economy.

This study is primarily a qualitative study based on about forty extensive interviews of corporate executives operating in three sub-sectors of the housing industry: professional construction services (builders, engineers, architects, etc.), manufacturers of building products and manufacturers of pre-fab homes. The interviews were conducted with firms from all corners of Canada. The purpose was not so much to identify the objective export-related difficulties as it was to see how corporate executives perceived these difficulties.

The study's conclusions are the following:

1. Firms generally tend to underestimate the difficulties, constraints and barriers related to international commerce.
2. For business, one of the main challenges in international business is delivering the product and the service within the required timeframes.
3. Corporate executives do not fear market globalization.
4. Few firms are concerned with diversifying their markets.
5. Businesses in the housing sector are not very familiar with the competition in target markets abroad.
6. Building systems which use wood have a harder time penetrating foreign markets.
7. Firms are reserved with respect to government assistance.

Prepared by François Cadotte. CMHC Project Officer: Joanne Hallé. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
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NEGOTIATING WITH THE BUYER

This guide provides some practical approaches to international negotiation for the new housing exporter, particularly the housing product manufacturer preparing to negotiate a first sale abroad. In the process, the guide also provides assistance for more complex export negotiations, such as joint ventures or the export of services. New Canadian exporters, who may be excellent negotiators on their home turf, need assistance in dealing with what is different in export negotiation: a variety of business cultures and approaches to negotiation, bargaining in particular.

Chapter 1 shows how to prepare for negotiation. Chapter 2 describes and illustrates practical negotiation. Chapter 3 offers a number of case studies from a survey of industry senior executives on their negotiation practices, while Chapter 4 provides an introduction to the negotiating styles of several foreign cultures. Chapter 5 presents an introduction to the main export contracts, an outline of the sequence from quotation to the completion of the contract, and important clauses to include in it; Chapter 6 describes the Incoterms. An annotated bibliography and Internet sites complete the guide.

This guide assumes that the exporter has completed the process of marketing, selected a target market (see the guide titled Getting Ready to Export), ensured proper financing (see the guide titled Documenting Export Financing), screened the buyer and market (see the guide titled Screening the Buyer) and is now ready to negotiate the first international sale.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 49 pages

NOTE : Aussi disponible en français sous le titre : *Comment négocier avec les acheteurs.*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 49 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

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OUTLOOK STUDY ON HOUSING MARKETS IN THE UNITED STATES

This report on the United States housing market includes four distinct areas of analysis. They are:

1. Regional Overview: a summary of the building activity and demand-supply balance in the largest markets across the country.
2. Homebuyer Profiles: a summary of the typical buyer profiles and how those profiles differ in each region of the country.
3. Materials Purchasing: a summary of the materials demanded and the criteria used to select supplies.
4. Design Centres: an overview of how design centres are changing the way homes are built and sold.

Prepared by The Meyers Group. Prepared for the Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999. 64 pages

NOTE : Aussi disponible en français sous le titre : *Étude de perspectives sur les marchés de l'habitation des États-Unis*

STATUS : New Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 64 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

POTENTIAL FOR BUILDING PRODUCTS CO-VENTURES, EXPORTS AND CANADIAN EXPERTISE FOR SUSTAINABLE HOUSING DEVELOPMENT IN CHINA

This report provides an overview of urban development and housing in China with information on:

- Changing demographics and the new economy; - A typical new housing project in urban China;
- Regional differences; - Home ownership in China; and - The state of residential building technology and construction in urban China.

This study identifies the range of construction materials, products and services related to sustainable development that could be utilized by China's housing industry. In particular, it has identified the following key areas for export/co-venture opportunities in China: - site remediation - lightweight non-combustible systems and materials - alternatives to clay brick - production facilities for cement, reinforcement, structural steel and coated steel; and - interior products ranging from painting and decorating supplies to communication and security systems and wiring components.

A table listing typical pricing information for various building products and materials supplied in China is included.

Prepared by Urban Ecology Design Collaborative. Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999.

STATUS : New Completed Report

AVAILABILITY : Available only on a loan basis from:

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RESEARCH ON THE HOUSING MARKET IN SPAIN

The purpose of this project is to prepare a report on the housing market in Spain.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication will not be published
CIDN : 2241 0900001
STATUS : Planned

RESEARCH STUDY ON THE HOUSING MARKET IN THE UNITED KINGDOM

The purpose of this project is to prepare a report on the housing market in the United Kingdom.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available
CIDN : 2302 0900001
STATUS : Completed

RETROFITTING RUSSIA'S HOUSING STOCK: OPPORTUNITIES AND OBSTACLES FOR CANADIAN EXPORTERS

The purpose of this project is to identify several basic business development strategies which could be employed by Canadian firms to practically and realistically respond to the market opportunities represented by the Russian housing sector.

CMHC Project Officer : *Oliver Drerup*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available
CIDN : 1830 0200001
STATUS : Ongoing Project

SCREENING THE BUYER

This booklet is for the new housing exporter who receives an unsolicited expression of interest from an unknown foreign buyer. You may be a builder, a manufacturer of housing products or a service provider. In the middle of a busy day, someone from Russia or Japan or Jamaica calls your order department. He says his company is interested in buying a quantity of your product or service, and asks for a price quotation.

What do you do? Do you take time to deal with what may be a frivolous call, or do you ignore what could be a serious inquiry? Is there a way to deal systematically with all such unsolicited expressions of interest? This booklet will help you develop 1) a method to screen foreign inquiries, eliminate spurious or casual requests and focus on the serious ones and 2) a general approach to answering foreign inquiries quickly and appropriately, without waste of time or resources.

Chapter 1 organizes the questions to ask to get information on the unknown country, housing market, and buyer. Chapter 2 outlines a rough screening "rule of thumb" based on the type of market as a guide to creditworthiness. The use of the Screening Questionnaire is explained. Chapter 3 shows how to prequalify the creditworthy buyer and is based on the experience of successful Canadian exporters. Chapter 4 presents a description of the process used by four successful Canadian housing exporters in dealing with an expression of interest from a foreign buyer. The guide ends with a comprehensive list of free and commercial resources.

Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre, c1998. (Guides for the New Housing Exporter) 59 pages

NOTE : Aussi disponible en français sous le titre : *Comment évaluer les acheteurs éventuels*

STATUS : New Completed Report

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SERVICE SECTOR EXPORT STRATEGY FOR THE MARITIMES

The purpose of this project is to conduct formal consultations of external clients in the serivce sector to obtain their views on foreign market development, identify any issues that may be impeding on their participation, and provide CMHC an export strategy for the service sector.

CMHC Project Officer : André Robichaud ***CIDN*** : 2235 0900001
Division : Canadian Housing Export Centre ***STATUS*** : Completed
AVAILABILITY : Publication will not be published

STUDY OF FACTORY-BUILT HOUSING MARKET OPPORTUNITIES IN SOUTHEASTERN U.S.A.

The purpose of the first of this two-part study was to investigate the potential niche markets open to Canadian manufacturers of factory-built housing in the Southeastern United States. Produced in late 1998, the report provides a substantive examination of the housing markets in Alabama, Georgia, Mississippi, North and South Carolina, and Tennessee. The author of the report states that these specific housing markets were targeted because this particular geographic area is experiencing strong economic growth and that this market is currently a fragmented residential construction market.

Data were collected through research tools such as telephone and personal interviews, analysis of previous research and demographic information on the primary geographic market.

The research reveals there is a growing market for wall panels, as well as timber frame and log homes. A number of US builders interviewed for this project expressed an interest in developing a working relationship with Canadian manufactured housing firms.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1999.

NOTE : Aussi disponible en français sous le titre : *Étude sur les débouchés pour les maisons usinées dans le Sud-Est des États-Unis.*

STATUS : Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 58 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI

The purpose of this project is to undertake a study to provide Canadian companies with a general overview of the market forces within the building products sector in the three state regions of Illinois, Wisconsin, and Missouri.

CMHC Project Officer : *Carol M Kerley*	***CIDN*** : 2172 0900001
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	

STUDY ON OUTLOOK OF HOUSING MARKETS IN THE UNITED STATES

The objective of this project is to provide Canadian active and potential exporters with the information needed to successfully increase their revenues in the United States.

CMHC Project Officer : *Carol M Kerley*	***CIDN*** : 2206 0900001
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	

STUDY ON RENOVATION MARKET IN THE UNITED STATES

The purpose of this project is to conduct a study on the renovation market in the United States.

CMHC Project Officer : *Carol M Kerley*	***CIDN*** : 2240 0900001
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available	***NEW***

STUDY TO DETERMINE THE NEED FOR A PRIVATE SECTOR HOME WARRANTY PROGRAM TO SUPPORT CANADIAN HOUSING EXPORTERS

The purpose of this project is to assess the need for a private sector home warranty program to support Canadian housing exporters.

CMHC Project Officer : *Louis Musto*	***CIDN*** : 2243 0900001
Division : Canadian Housing Export Centre	***STATUS*** : Ongoing Project
AVAILABILITY : Publication will not be published	

STUDY TO IDENTIFY AND PROFILE CANADA'S HOUSING EXPORTER AND PROSPECTIVE EXPORTERS IN ATLANTIC CANADA

The purpose of this project is to develop a database to identify Atlantic Canadian firms in the housing sector involved in or interested in exporting opportunities and to collect descriptive information on the firms indentified.

CMHC Project Officer : *Charles MacArthur*
CIDN : 2152 0900001
Division : Canadian Housing Export Centre
STATUS : Completed
AVAILABILITY : Publication will not be published

SURVEY OF CANADIAN HOUSING-RELATED EXPORTERS AND POTENTIAL EXPORTERS

The purpose of this project is to carry out a quantitative study among companies that are either current or potential housing-related exporters.

CMHC Project Officer : *Louis Musto*
CIDN : 2175 0900001
Division : Canadian Housing Export Centre
STATUS : Completed Report
AVAILABILITY : Publication will not be published

SUSTAINABLE DEVELOPMENT IN CANADA

The objective of this project is to investigate the application of Canadian sustainable development in the Japanese market.

CMHC Project Officer : *Jay Thakar*
CIDN : 2092 0900001
Division : Canadian Housing Export Centre
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

TRENDS IN THE JAPANESE HOUSING MARKET: PRELIMINARY SUMMARY

Japan is one of the world's largest housing markets. Canada is a leading exporter of building materials and services to Japan and has actively promoted the use of Canadian housing systems through a variety of initiatives. Imports of housing, however, comprise only a small proportion of total Japanese housing activity so the potential to expand this market share presents attractive opportunities for Canadian housing producers and suppliers. This 6 page summary provides 1. an overview of recent trends in the Japanese housing market and housing imports; 2. a preliminary assessment of market opportunities for Canadian housing companies in Japan; and 3. identifies a number of potential market niches including:-- large-scale wooden buildings;-- exterior finishes on buildings in quasi-fire protection areas;-- energy-efficient and healthy housing;-- housing for the elderly; and-- the renovation market.

Prepared by Greg Lampert Economic Consultant and Cyber Builders International, Tokyo Kagoshima Edmonton. Prepared for Canadian Housing Export Centre, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999. 6 pages

NOTE : Aussi disponible en français sous le titre : *Tendances du marché de l'habitation au Japon : résumé*

STATUS : New Completed Report

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UPDATE OF THE STUDY ON MID-ATLANTIC BUILDING MATERIALS MARKET

To support an update of the study entitled "Business Opportunities for Canadian Building Materials Manufacturers in the Mid-Atlantic Region of the U.S. of America" with new actual and forecast data.

CMHC Project Officer : *Carol M Kerley*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2228 0900001
STATUS : Ongoing Project
NEW

DEMAND PROFILES FOR HIGHER-DENSITY HOUSING

This study examines the relationship between building types as defined by the relative density of projects and household characteristics. It uses the 1991 Census Public Use Micro Data Files (PUMF) to identify the characteristics that distinguish the demand for four types of dwellings:

- the single-family house;
- the duplex, row, semi-attached and attached options that will be referred to as the duplex and townhouse option;
- the under five-storey apartment building; and
- the highrise apartment.

It considers households as formed by couples with children, couples without children, lone parents, and people living alone or with other unrelated people.

The aim is to develop profiles describing the characteristics of households generating the demand for units in higher-density building types and to identify target populations whose entry into the medium-density housing options would contribute most to the goal of making our cities more compact while maintaining a reasonable level of risk in the marketing of units.

The study starts by examining the 1991 census data to describe the households and housing options of Ottawa residents. It links the propensity of the different household types to occupy each of the four buildings types with the Canada Mortgage and Housing Corporation (CMHC) long-run projections of households for the Ottawa region. These projections form a basis for the discussion of how changes in income and housing prices may affect future demand. The role of the existing stock is discussed and a base-line projection developed for the proportion of future housing starts that will be in higher-density buildings. The study concludes by describing household profiles that can serve as targets for the development of new higher-density housing options.

Prepared by Andrejs Skaburskis. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Fanis Grammenos. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series)

Order number: PE0341

NOTE : Aussi disponible en français sous le titre : *Profils de la demande de logements de secteur à haute densité.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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HOUSING FORECASTING AND DEMAND

HOME PRICES: LONG-TERM DETERMINANTS AND PROSPECTS

With the aging of the baby-boom generation, the number of young households is falling in Canada. This study examines the contentions of the demographer David Foot, and of earlier work by Mankiw and Weil, that in such a population, the number of home buyers is bound to decrease, causing the prices of residential real estate to drop substantially. In addition to reviewing the relevant economic literature, it constructs econometric models using Canadian national and provincial data and uses them to assess whether expected demographic changes in Canada are likely to trigger a pronounced downward trend in residential real estate prices.

The study concludes that even if it is true that demographics may exert downward pressure on real estate prices, such impact will probably be dominant only in certain regions, depending even there on their rates of growth in real income. In other regions, the real price should have a tendency to rise.

Socio-economic Series Research Highlights Issue 62 is available on the CMHC web site. Full report forthcoming.

CMHC Project Officer : *Ian Melzer*

CIDN : 1961 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

HOUSING MARKET

ÉTUDE DES CYCLES DE L'EMPLOI ET DES MARCHÉS DE L'HABITATION

This report comprises three parts. The first part reviews the literature on the interaction between the labour market and residential real estate activity. The authors are particularly interested in the cyclical relations through which the situation on the labour market influences the residential construction and home resale trends. They are also seeking to identify any new trends observed on the labour market or elsewhere that could have changed the nature and scope of the interactions between the labour market indicators and the residential real estate activity indicators.

The second part presents the strategy that the authors intend to use to estimate the elasticities of the employment indicators on housing starts and MLS sales. They justified the choice of the indicators and the choice of the methods.

The object of the third part is to present the empirical results concerning the elasticities of the residential real estate activity indicators in relation to the employment indicators. The work consisted in verifying and specifying how the signals (informational content) emitted by the labour market indicators could serve to forecast changes in residential real estate activity as measured by housing starts and MLS sales.

Prepared Yvon Fauvel, Alain Paquet, Christian Zimmermann. Montréal: Centre de recherche sur l'emploi et les fluctuations économiques [centre for research on employment and economic fluctuations], Université du Québec à Montréal, 1999.

STATUS : New Completed Report

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HOUSING MARKETS IN BC RESOURCE COMMUNITIES: CASE STUDIES FROM THE 1980S TO THE 1990S

This report examines how the cycles of the resource sector impacts the housing markets in six resource-dependent communities in BC. The selected communities and their primary resource base are: Port Alberni - Forest products; Prince George - Forest products; Prince Rupert - Forest products and fishing; Fort St. John - Oil and gas; Trail-Rossland - Mining; and Kelowna - Diversified.

The stages of the study included:

- Search on housing models at the regional level.
- A historical review of the communities' economies and the housing market.
- The estimation of multiple-regression models for the housing market variables, single-family house (SFD) prices, single-family house sales, single-family housing starts and total housing starts using EViews.
- Testing of the regression models for structural consistency over subsets of the sample period.
- The estimation of ARIMA models for the housing markets.
- A comparison of the modeling and forecasting capabilities of the regression models for the ARIMA models.
- Base case simulations for the community housing market variables out to 2004.

The purpose of the study is to provide CMHC with a methodology that would permit simulations of significant discrete outlooks for various resource sectors on the housing markets of known resource-dependent communities. The methodology could become another tool used for strategic planning and risk analysis.

The conclusions of the study are:

- There is virtually nothing in the literature that investigates the relationships of housing markets to economic or resource cycles at the micro regional level like in this study.
- The housing markets of resource-dependent communities are significantly impacted by resource cycles.
- Typically, resource production variables were more important than resource prices in impacting housing markets.

- The housing cycles tended to be much longer and more severe than resource cycles, possibly due to major stock adjustments required in the housing markets as a consequence of dramatic structural changes forced on BC's resource industries.
- The regression models' coefficients, with few exceptions, were stable as determined by various stability tests.
- The regression models capture most of the dramatic adjustments in the housing markets since the late 1970's.
- In general, the quality of the model results are positively correlated with the size of the communities.
- The best model results were for house prices, followed by single-family starts, single-family home sales, and then total starts.
- The regression models are superior to the ARIMA models in replicating history, tracking major turning points, and in forecasting accuracy.
- The methodology is widely applicable to other resource-dependent communities.

The study results provide a valuable tool for assessing the degree of risk facing housing markets in resource-dependent communities.

Prepared by G.A. Pedersson & Associates. CMHC Project Officer: Joel Starkes. Ottawa: Canada Mortgage and Housing Corporation, 2000.

STATUS : New Completed Report

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HOUSING TRANSITION IN SINGLE INDUSTRY 'INSTANT TOWNS'

Single-industry communities are a common part of the Canadian rural landscape. In many cases, these communities were developed by a single firm or industry to provide a focal point for local extraction and/or processing operations, as well as to house the needed workforce. Often isolated from other communities, the local housing market is influenced by the health of the resource industry. As a result, changes in the viability of the industry affect the local housing market. Restructuring pressures within the resource sector have led to a re-evaluation of the viability of constructing new, and in some cases maintaining old, single industry communities. This research examines two single industry "instant towns" in Canada with the purpose of tracking transitions within the local housing market as the economic fortunes of the local industry and community change through time. An understanding of these isolated markets is needed to inform government policy and will be useful to resource companies seeking to evaluate new development costs, to local decision-makers interested in community development, and to households participating in the housing market.

The research was based on a comparative study of Mackenzie and Tumbler Ridge, British Columbia. The scope and objectives of the research were fourfold:

1. To develop an historical and contemporary portrait of the local housing market in these single-industry instant towns.

2. To identify and track the timing of past corporate strategies with respect to the selling off of housing stock to employee residents.

3. To identify the nature and scale of economic benefits or costs which may accrue to households through housing purchase in this type of community context.

4. To identify the nature and scale of economic benefits and costs which may accrue to institutions such as the resource development corporation or Canada Mortgage and Housing Corporation.

The research methodology involved 6 stages. These included a background literature review on previous work on this topic, development of baseline housing data and a local housing history for each community, a review of local housing construction activity, a summary of changing housing investment values, and an analysis of the collected information.

Prepared by Greg Halseth and Lana Sullivan. CMHC Project Officer: David Scherlowski. Ottawa: Canada Mortgage and Housing Corporation, 2000 (External Research Program)

STATUS : New Completed Report

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Canada Mortgage and housing Corporation
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IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO

This study seeks to generate a framework for addressing the changes in the availability of affordable housing stock in large Ontario cities through conversions of rental units and, by extension to understand the impact of these conversions on other components of the housing market, in particular the new homes market.

CMHC Project Officer : *Alain Miguelez*
Division : Market Analysis Centre
AVAILABILITY : Publication is not available

CIDN : 2226 1000001
STATUS : Ongoing Project
NEW

WHISTLER HOUSING MARKET

The objective of the research was to investigate the evolution of the housing market in the Resort Municipality of Whistler, which has emerged as the most expensive housing market in Canada. The median price of single family homes sold in the first quarter of 2000 was $662,000, up 21% from the median price recorded in the last quarter of 1999.

In 20 years, Whistler has grown from a handful of residents to almost 10,000. The number of visitors has also grown exponentially - more then 2 million skier visits were recorded in the 1999 ski season. Almost 85% of Whistler's population is under the age of 45 in contrast to only 67% of the B.C. population. The population over the age of 65 represents just 1% of Whistler's population, compared to 13% of the B.C. population. About 57% of all households in Whistler are renters, compared to 34.5% of the B.C. population.

The housing market in Whistler is complex with 11 different housing types and tenures: hotels; condominium hotels, townhouses, single family residential where tourist use is not permitted; single family residential where tourist use is permitted; quarter-shares; auxiliary suites; timeshares; campgrounds; parking lots; and resident housing.

High housing prices in Whistler result in 20% of Whistler employees living in the more affordable communities of either Squamish or Pemberton which are more than 30 minutes commute by car. Overall, about 53% of property owners in Whistler live in the Vancouver area, 25% are Whistler residents and 2% live in other parts of B.C., meaning that 90% of registered property owners live in B.C. However, purchases by international buyers are increasing, so the proportion of B.C. ownership is likely to decline in the future.

Whistler housing has market appeal due to increasing international exposure, the prestige value of owning Whistler real estate, the lack of good snow in Colorado ski resorts over the last two years, the low Canadian dollar, better flight connections to and from Vancouver International Airport, improved infrastructure (more and better ski lofts and golf courses), new hotels that advertise heavily for an international and wealthy clientele, and, importantly, the Internet, which has revolutionized resort marketing.

Whistler has instituted a development cap in its Official Community Plan that will likely be reached in 3 years. Unless the cap is modified, demand will surpass supply and house prices will invariably increase. Some real estate professionals are anticipating Whistler home prices comparable to the internationally-renowned ski resort at Aspen, Colorado, where home prices are about three times the level of Whistler prices.

If the Vancouver-Whistler bid for the 2010 Winter Olympics is successful, the experience of other Winter Olympic cities indicates that the impact on the housing markets of Whistler will be minor. Probably the most significant item of infrastructure as far as Whistler (and Squamish) are concerned would be transportation improvements between Vancouver and Whistler. It is probable that the impact of the Winter Olympics would be more significant for Squamish and Pemberton than for Whistler. Whistler is already very well known on the world stage, unlike either Squamish or Pemberton.

Prepared by Kathleen Mancer, Kathleen Mancer Consulting in association with Pip White, Urban Aspects Consulting Group. CMHC Project Manager: Charles King. Ottawa: Canada Mortgage and Housing Corporation, 2000.

HOUSING MARKET

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INFRASTRUCTURE

ALTERNATIVE METHODS OF FINANCING MUNICIPAL INFRASTRUCTURE

This paper is intended to serve as a backgrounder for two related studies on financing municipal infrastructure:

- Provision of Municipal Infrastructure Through Demand Management: Guidebook and Case Studies
- Public-Private Partnerships in Municipal Infrastructure

In the view of many observers, there has been insufficient, and in some cases inappropriate, investment in Canada's urban infrastructure over the last two decades. Much needed maintenance and repair in existing urban areas are often deferred in favour of infrastructure expansion to new communities on their fringe. The result has been gradually deteriorating facilities in already built-up areas, and a dispersed urban development pattern that is increasingly expensive to service. With other priorities such as health care and education, competing for scarce tax dollars at all levels of government, many municipalities are looking at alternative methods of financing urban infrastructure.

This paper looks at some of the issues surrounding infrastructure finance, including the importance of quality urban infrastructure, the perceived expenditure gap in existing facilities, estimated investment requirements and the efficiency of current development patterns. Based on the assumption that a variety of financing tools are required to supplement government-financed infrastructure, the paper provides an overview of alternative financing mechanisms ranging from development charges and special district financing to user charges and trust funds.

This paper draws on studies presented at a workshop held at the University of Western Ontario in June 1992: Infrastructure and Housing - Challenges and Opportunities. The workshop was co-sponsored by CMHC and the Canadian Home Builder's Association.

Ottawa: Canada Mortgage and Housing Corporation, c1999 (Housing Affordabilty and Finance Series)

Order number: PE0368

Note : Aussi disponible en français sous le titre : *Les différents mécanismes de financement de l'infrastructure municipale, PF0368.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

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PROVISION OF MUNICIPAL INFRASTRUCTURE THROUGH DEMAND MANAGEMENT: GUIDEBOOK AND CASE STUDIES

This paper is the second in a series of three Canada Mortgage and Housing Corporation (CMHC) studies looking at infrastructure finance. This paper looks at the ability of demand management (DM) measures to contribute to meeting future water and wastewater infrastructure demands.

Demand management (DM) deviates from traditional water and wastewater system planning by focusing on what causes the demand for water and wastewater services. DM looks at why peaks occur and how to reduce them. The approach focuses on shaping demand, as a precursor to meeting demand.

Part I of this report (the Guidebook) introduces DM, describes DM techniques and identifies how to tailor DM programs to the needs and goals of specific communities. It introduces tools that can be used by planners, engineers and administrators to reduce water use and wastewater flow, including the reduction of systems losses due to leaks and the reduction of wastewater flow due to inflow and infiltration. The Guidebook then discusses the engineering considerations of water and wastewater conveyance and treatment systems which assist in ensuring that public health and the environment are protected. The goal is to provide a balanced perspective of DM considering risks, effectiveness and costs. While DM is not identified as a panacea, it has a role and this role is identified.

Part II of the report (the Case Studies) profiles DM initiatives in the following communities:

- City of Barrie, Ontario;
- City of Edmonton, Alberta;
- Greater Vancouver Regional District, British Columbia;
- Communauté Urbaine de l'Outaouais, Quebec;
- Regional Municipality of Ottawa-Carleton, Ontario;
- Town of Port Elgin, Ontario;
- City of Regina, Saskatchewan;
- Regional Municipality of Waterloo, Ontario; and
- City of Windsor, Ontario.

It is hoped that the Guidebook and Case Studies will encourage readers to further explore DM opportunities for their communities. Resources and references are identified throughout to assist those interested in pursuing this topic.

Prepared by CH2M Gore & Storrie. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David D'Amour. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series)

Order number: PE0353

NOTE : Aussi disponible en français sous le titre : *Production des équipements d'infrastructure municipale par la régulation de la demande : guide et études de cas*

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PUBLIC-PRIVATE PARTNERSHIPS IN MUNICIPAL INFRASTRUCTURE

Adequate, efficient and well-maintained municipal infrastructure is one of the key components of a viable, prosperous economy, and a significant determinant of quality of life. As competition for scarce resources at all levels of government increases, infrastructure upgrades and expansion are becoming increasingly difficult to finance.

This paper is the third in a series of three CMHC studies looking at infrastructure finance. It explores the potential for public-private partnerships to fund the provision, operation and maintenance of municipal infrastructure. This paper examines the private sector's involvement in urban infrastructure. The study looks at the impacts of public-private partnerships on service costs and quality and examines whether privatization reduces costs to existing and new homeowners. It looks at different partnership models, discusses their strengths and weaknesses and presents a number of case studies, shedding light on which models are most appropriate under which conditions.

Contributing consultants: IBI Group, Dillon Consulting Limited, The Acumen Consulting Group, Lapointe Consulting, Paterson Planning and Research Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David D'Amour. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series: Research Report)

Order number: PE0352

NOTE : Aussi disponible en français sous le titre : Les partenariats public-privés en matière d'infrastructure municipale.

STATUS : Completed Report

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BRINGING HOME OWNERSHIP WITHIN REACH ... WITH MORTGAGE LOAN INSURANCE

This brochure provides helpful advice and useful tables to assist in buying a home, from calculating the amount needed to save for the down payment to working out initial expenses including those of moving, renovation and the purchase of furniture, carpeting, drapes, etc. The brochure defines mortgage loan insurance and the qualifications of eligibility. Tables on calculating gross debt service and total debt service allow one to work out what one can afford to buy. Other tables give an idea of the maximum home price one is able to afford and help calculate monthly mortgage payments.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 10 pages.

Order Number: NHA 2478

NOTE: Aussi disponible en français sous le titre : *Bientôt propriétaire ... grâce à l'assurance prêt hypothécaire*

STATUS : New Completed Brochure

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BUYING A HOME WITH CMHC: EASY AS 1-2-3! = L'ACHAT D'UNE MAISON AVEC LA SCHL : SIMPLE COMME BONJOUR!

This brochure describes how Canada Mortgage and Housing Corporation - the Government of Canada's national housing agency - helps Canadians gain access to a wide choice of quality, affordable homes. In addition to outlining CMHC's housing finance activities, it defines mortgage loan insurance, its cost, and which properties are eligible.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 5 pages.

Order Number: NHA 2485

NOTE: Bilingual

STATUS : New Completed Brochure

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EVOLVING IMPACT OF E-COMMERCE ON HOUSING FINANCE ACCESS AND AFFORDABILITY: US EXPERIENCE AND LESSONS FOR CANADA

The objective of this research is to examine the significant changes arising in the housing finance market place resulting from e-commerce and their impact on housing finance access and housing affordability. An overview of experience to date and international comparisons with the US will be instructive to Canadian stakeholders and will assist in developing and focusing a program of useful related directed research.

The research project will entail a literature review, Internet searches, interviews and discussions with knowledgeable US and Canadian industry participants, government regulatory agencies, housing sector stakeholders and other key informants.

CMHC Project Officer : *Ian Melzer*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Ongoing Project

NEW

INVESTIGATION INTO THE CAUSES OF RISING MORTGAGE DEBT AND IMPLICATIONS ON THE MORTGAGE MARKET

This study looks at the rising level of mortgage debt in Canada and its implications. The Bank of Canada has noted, with some concern, the rising level of household debt in general and mortgage debt in particular. CMHC has attributed the rise in the latter to mortgages on other than primary residences, and has pointed out that aggregate trends do not take into account the correlation between debts and corresponding assets. By the same token, the National Housing Act (NHA) was changed in 1992 to allow residential mortgages of 95 per cent of the lending value, and first-time owners are allowed to use some of their Registered Retirement Savings Plan (RRSP) funds. These changes should have increased the aggregate demand for mortgage loans. This study extricates the statistical evidence related to growth in mortgage debt and interprets what the trends are indicating.

The study found:

- Despite the rising level of consumer debt, the state of the household balance sheet, on a national accounts basis, is wrong.

- The rising level of consumer debt is principally due to a rising level of mortgage debt, almost exclusively loans by the chartered banks. However, included in the mortgage debt numbers is an unknown quantity, which represents rental properties, cottages, nursing homes, retirement communities and other non-primary residences. A conservative estimate of these portions, taken together, would be approximately one third, in line with the tenure breakdown of the housing stock.

- Despite the use of an estimate of household mortgage indebtedness inflated by mortgages on properties other than principal residences, the mortgage loans outstanding remain well secured by the housing wealth of the country, which continues to rise, albeit at a more modest pace that in previous decades.

- At the household level, using data from the FAMEX from 1982 to 1992, there is no evidence that households have become appreciably more mortgage-indebted over that period. The 1996 survey, when it becomes available, will show the effect of the program-driven, high-ratio mortgages on the overall picture.

- According to industry sources interviewed for this study, credit, is to some extent, supply-enabled, in the sense that the availability of credit and its terms and conditions help shape the debt load assumed by individuals and households.

- There is no evidence of a direct link between high aggregate mortgage debt and the rising level of bankruptcy. Homebuyers who go bankrupt are most likely to be first-time buyers with unresolved debt management issues.

- Finally some portion of the growth in aggregate debt could be expected given the underlying demographics - the baby boom generation has been moving through its peak borrowing years. At this group moves into its saving period, a smaller group will replace it. At the same time, the baby boom generation also stands to inherit a substantial amount of wealth from its prewar parents' generation. The conjuncture of these elements should mean that the high consumer debt will start to decrease.

Prepared by the Corporate Research Group Ltd. in association with Fuller Information and Jacobson Consulting Limited. Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

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PERSPECTIVES À LONG TERME DE LA DEMANDE DE PRÊTS HYPOTHÉCAIRES AU CANADA

Due to weaker demographic growth, the need for new homes is declining, which is having a moderating impact on housing starts. In addition, the Canadian population is aging and will likely not have to borrow as much to buy a home. The objective of this study is to estimate the effect of these trends on the Canadian residential mortgage market.

This econometric study reviews and extends the economic theory which is aimed at explaining the demand for mortgages, and the related empirical work. It then examines a variety of scenarios for the period to 2026. The study found that the value of new mortgage loans is highly correlated with that of housing, but is also affected by the level of interest rates. The number of new mortgage loans is affected by the level of interest rates and the number of persons in the 25 to 34 age group. The total value of outstanding mortgage debt over time is affected most by the progression of incomes.

The projections suggest that while the average value of new mortgage loans will increase, the total value of outstanding mortgage debt in real terms (i.e. adjusted to remove the effects of inflation) and the number of new mortgage loans may fall, particularly over the period from 2003 to 2026. The extent of the decrease will depend on the path of economic growth and the size of the 25 to 34 age group.

Prepared by Mario Fortin and André Leclerc. CMHC Project Officer: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2000.

STATUS : New Completed Report

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MORTGAGES AND HOUSING FINANCE

YOUR CLIENTS FOUND THEIR DREAM HOME = VOS CLIENTS ONT TROUVÉ LA MAISON DE LEURS RÊVES

This brochure is directed to lenders and real estate agents and provides a brief description of CMHC's purchase plus improvements program option. In addition to a description of what clients need to apply, the brochure gives an example of how the option works and lists contacts for further information.

Ottawa: Canada Mortgage and Housing Corporation, 2000. 3 pages.

Order Number: NHA 2512

NOTE: Bilingual

STATUS : New Completed Brochure

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PERSONS WITH DISABILITIES

ACCESSIBLE DOWNTOWN RESIDENTIAL COMMUNITIES: A CASE STUDY OF WINNIPEG, MANITOBA

The purpose of this project is to identify housing and community design needs of persons with mobility, dexterity and sensory disabilities to determine how these needs can be met in a downtown residential location as part of the revitalization of the downtown area. Incorporating diverse physical needs in the design of the built environment will help to ensure that the resulting product is usable by all members of the community. Using interviews and focus group meetings, Downtown Winnipeg and other downtown areas are examined as accessible residential sites for persons with disabilities and seniors.

The research reviews design considerations and priorities in making housing and communities accessible and usable by persons with disabilities, which will benefit everyone regardless of age, ability or size. Numerous strategic actions are proposed for downtown stakeholders to improve accessibility in residential developments and neighbourhoods within Downtown Winnipeg as part of a comprehensive downtown accessibility strategy. These actions are designed to contribute to greater livability and usability to the downtown area, which will have an important impact on the success of downtown revitalization initiatives in Winnipeg as well as other cities.

Prepared by Nancy Klos, Don Ament, Brian Everton with Ragini Dayal. CMHC Project Officer: Tom Parker. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

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EXAMINATION OF THE HOUSING CHOICES OF PERSONS WITH DISABILITIES

This project's objective is to have accurate information on the housing choices of people aged 15 and over with mobility and agility disabilities.

CMHC Project Officer : *Tom Parker*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200019
STATUS : Ongoing Project

EXAMINATION OF THE SUPPORTIVE HOUSING NEEDS OF THE SERIOUSLY MENTALLY ILL IN THE MANITOULIN-SUDBURY DISTRICTS

This External Research study aimed to explore and specify the supportive housing needs, preferences and choices of adults with serious mental illnesses, and in particular to identify similarities and differences among subgroups of this "SMI" population along the lines of geographic location, language/culture, and gender. The study was undertaken in the Manitoulin-Sudbury area of Ontario, where community locales range from urban to rural and remote, and significant proportions of the population are anglophone, francophone and Aboriginal, respectively. One hundred mental health services consumers were interviewed from across the region, plus a cross-section of mental health services providers and representatives of consumer/family support groups. Results indicated that there is a need for supportive housing among all SMI population subgroups regardless of geography, language/culture or gender. The most notable difference among the subgroups was related to geography: consumers living in rural communities outside of the Sudbury district have a higher need for supportive housing because of increased isolation and lack of access to public transportation. Variations by language/culture and gender are also noted in the report although they were not found to be statistically significant in this sample. The report concludes with a series of recommendations to address the identified supportive housing needs.

Prepared by Geneviève Gibbons, David Paquette. CMHC Project Officer: Teresa van den Boogaard. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

STATUS : Completed Report

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MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

CMHC Project Officer : *Rachelle Luengas*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2021 0200001
STATUS : Ongoing Project

PERSONS WITH DISABILITIES

SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS

The research will evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

CMHC Project Officer : *Tom Parker*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2009 0200001
STATUS : Ongoing Project

PROPERTY MANAGEMENT

CANADIAN RESIDENTIAL PROPERTY MANAGEMENT INDUSTRY PROFILE

The objective of this project was to produce a profile of the residential property management industry containing statistical and descriptive information concerning the size and concentration of the industry, and the roles and responsibilities of key players. It found that the residential property management industry is concentrated in Ontario, followed by Quebec and British Columbia. At the national level, in 1996, the Canadian residential property management industry comprised 13,689 establishments with: revenues of $8.5 billion; profits of $560 million; and employees earning $1.3 billion in salaries and employee benefits. These findings and others are provided at the provincial level as well. This is the only consolidated source of information on the Canadian residential property management industry. It contains previously unavailable statistical information on the economic characteristics of the industry.

Prepared by Mike Ross, Jason Ducharme, Robert Sweeting, Didem Tiryakioglu, of KPMG LLP. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0364

NOTE : Aussi disponible en français sous le titre : *Profil de l'industrie canadienne de la gestion immobilière résidentielle.*

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REGULATORY REFORM

MUNICIPAL SURVEY OF REGULATORY REFORM

Through a survey of over 100 Canadian municipalities, the purpose of this study is to collect information on the status and effectiveness of regulatory reforms aimed at increasing housing affordability and choice. The survey will also identify housing-related issues considered to be key priorities by municipalities. The final report and research highlight are expected in the fall, 2000 and will be of interest to municipalities, builders, non-profit housing groups and housing professionals.

CMHC Project Officer : *Susan Fisher*
CIDN : 2279 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available
NEW

** SEE ALSO: *Regulatory Factors in the Retention and Expansion of Rooming House Stock*, p. 222

RENOVATION AND INSPECTION

DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBORHOODS

The project aims to develop an understanding of the forces and factors that trigger or accelerate neighborhood decline; create a consensual framework for action that can stem or reverse the housing decline spiral; ascertain the role of investment in housing as a primer for regeneration and identify opportunities for concrete action involving partnerships. Three cities that have experienced inner neighborhood decline and three that have successfully prevented decline are used as the basis for the analysis. Lessons are drawn about strategies or mechanisms that can arrest decline before it becomes a self-reinforcing spiral.

CMHC Project Officer : *Fanis Grammenos*
CIDN : 2124 020001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

HOMEOWNER MOTIVATION AND REVITALIZATION OF OLDER RESIDENTIAL NEIGHBOURHOODS: A STUDY OF INCUMBENT UPGRADING IN WINNIPEG: FINAL REPORT

Recent research in several cities has identified significant upgrading and renovation of homes by residents in stable modest income neighbourhoods. Distinguished from gentrification, which is associated with renovation of homes following the movement of higher income residents into older neighbourhoods, the upgrading in these stable lower income neighbourhoods is known as incumbent upgrading. Urban policy analysts recognize incumbent upgrading as an important process in preventing decline. This study focuses on three Winnipeg neighbourhoods in which incumbent upgrading is identified as the revitalization process. To improve our understanding of this process, a detailed analysis of the characteristics of these neighbourhoods is undertaken and the factors motivating modest income homeowners to upgrade their home and property are explored.

The work suggests that while public investment in improved infrastructure and community services is a motivating factor to spend money on improvements, other factors such as attachment to neighbourhood, perception of crime rates, neighbourhood cohesiveness, participation in neighbourhood organizations and a positive perception of neighbourhood in general may be more important. It follows that fostering this positive perception of neighbourhood may encourage upgrading in modest and lower income neighbourhoods and help prevent decline. The findings suggest that policies which help prevent or address existing systemic problems such as poverty and its numerous associated problems may be more important in fostering this positive perception than public initiatives to improve physical infrastructure.

Prepared by Tom Carter and Christian Douchant (principal investigators). Research assistants: John Hoehn and Maggie Fredrickson. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

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RENTAL REPAIR AND RENOVATION IN CANADA

This report presents analysis and data highlights from the Rental Repair and Renovation Expenditure Survey (RRRES). Statistics Canada conducted the RRRES on behalf of Canada Mortgage and Housing Corporation (CMHC). Clayton Research Associates Limited analyzed the information for presentation in this report.

Since 1988, through the Homeowner Repair and Renovation Expenditure Survey (HRRES), Statistics Canada has provided annual information on repair and renovation work undertaken by homeowners. However, no comparable information was available for rental units. The main objective of the RRRES, therefore, was to fill this information gap by collecting information on the expenditures made by landlords on repairs and renovations to rental units. The survey covered only private rental units; public housing units were excluded. As well, the survey excludes spending by tenants on rental units.

Respondents were asked to report repair and renovation expenditures (both costs of materials, and contracted work) for the following types of work: additions, renovations and alterations; replacement of equipment; new installations; repairs and maintenance. The RRRES also collected information on housekeeping costs.

In addition to an introduction, the report contains two main sections:
- "Highlights" summarizes key survey results from the RRRES.
- "Comparison to Homeowner Repair and Renovation Spending" compares the estimates of spending on private rental units with estimates for the ownership units from the HRRES.

In addition to the main report, the report contains three appendices:

- Appendix A reproduces the Labour Force Survey Contact Information Form, which was used to screen participants, and the Rental Repair and Renovation Expenditure Survey questionnaire.
- Appendix B discusses the survey methodology in more detail.
- Appendix C presents detailed tabulations for figures in the main report. These include data on the incidence of repair and renovation spending and the average spending per unit by type of work, region, structural type of building and period of construction.

Prepared by: Clayton Research Associates Limited. Project Manager: Patricia Arsenault. Prepared for: Canada Mortgage and Housing Corporation. CMHC Project Manager: Roger Lewis. Ottawa: CMHC, 1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0316

NOTE : Aussi disponible en français sous le titre : *Réparation et rénovation de logements en location au Canada*

STATUS : Completed Report

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CHANGING RURAL RENTAL MARKET IN ATLANTIC CANADA

This report describes how the rural rental market in Atlantic Canada has changed from the early 1990s to today. The term "rural" is used to include all incorporated communities of less than 10,000 in population, plus all incorporated areas, as defined by Statistics Canada. The study assessed the impact of the changing rural economy, the termination of new social housing construction, the decline in mortgage interest rates, and the implementation of the 5% down payment program for home buyers. This study also developed an understanding of the climate for investment in rental properties, identified opportunities for communities and government to support new rental housing construction, and developed an understanding of the risks associated with multiple unit development in rural areas and small towns.

Prepared by David Bruce. CMHC Project Officer: Carolyn Kavanagh, Atlantic Business Centre. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

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FEASIBILITY STUDY FOR A MULTI-UNIT RENTAL HOUSING DATABASE

This study reviews the feasibility of a data base on multi-family rental housing that would allow investors, developers and builders to obtain current market information on the operating costs and rates of return from alternative buildings. Specifically it examines the demand and potential use for this information, the willingness to pay to access the data, and most importantly, the willingness of industry participants to share information on their property. Clearly, central to such a data base are the procedures used to aggregate information to protect the confidentiality of individual properties. Based on extensive interviews, the study concludes that insufficient interest exists in the housing industry at this time to support this concept. Although respondents reported that they need information on individual urban multifamily markets, most think that costs for such a database would be prohibitive. They also believe that even in large centres, insufficient numbers of properties exist to support useful information once they are aggregated into clusters to protect identities; also, market information from one city is of little use in another. Finally, respondents stated that other issues need to be resolved (e.g. renewing the deteriorated stock) before a database is developed for the multifamily housing market. The results of this research report will be of interest to builders, housing analysts and rental housing investors.

Prepared by PRA Inc. CMHC Project Officer: David Scherlowski. Ottawa: Canada Mortgage and Housing Corporation, c2000. (Housing Affordability and Finance Series Research Report)

Order number: PE0377

Aussi disponible en français sous le titre : *Étude de faisabilité d'une base de données sur le logement locatif multifamilial*

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PENSION INVESTMENTS IN RENTAL HOUSING

The objective of this project is to assess whether Canadian registered pension plans (RPPs) and retirement savings plans (RRSPs) currently under invest in rental housing and, if so, whether there are specific obstacles to investment and policy options that would potentially increase investment. The scope of the study would encompass the entire private trusteed RPP and RRSP industry in Canada.

CMHC Project Officer : *Ian Melzer*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2305 0200002
STATUS : Ongoing Project
NEW

PRIVATE RENTAL POLICIES AND PROGRAMS: REVIEW OF THE INTERNATIONAL EXPERIENCE

This report examines the experience of 11 countries (including Canada) from Europe, Scandinavia, North America and the Pacific Rim in supporting a private rental sector as part of their national housing system. The purpose was to examine the extent to which other governments have developed policies and programs specifically to encourage the production of rehabilitation of the private rental stock.

The main body of the report reviews the objectives of the research, develops a framework for the comparative assessment and looks at the rental market in the selected countries. It then outlines policy issues specific to the private rental sector since 1980 and how each country has responded, summarizing the major policy and program initiatives, which have been identified for each country, and assessing the relevance of this experience for Canada.

An appendix provides a detailed profile of each country. It presents the general background on the relative importance of the private rental stock in each country's housing system, the regulatory and tax regimes that affect private rental housing, and the current policy issues related to the private rental sector. Detailed assessments of specific major policies and programs in each country are also included.

Key findings of the report include:

1. In almost all countries, except in instances of pressing urgency, governments have adopted a "laissez-faire let the market forces prevail" approach with regard to encouraging and facilitating private rental housing.
2. Across all countries, the fundamental cause of the low level of investment in private rental production and rehabilitation is the lack of a competitive return relative to other forms of investment, especially in light of the risks inherent in rental investment.
3. The only countries that appear to have maintained a healthy investment for private rental housing without direct subsidies are New Zealand and Australia. Notably, neither have rent controls and permit depreciation and deductibility of rental losses against other sources of income.
4. Variants of virtually all the policy and program initiatives used in other countries have been attempted in Canada over the last three decades.
5. The most critical rental issue facing most governments is not simply the lack of private rental housing production, but the problem that many low-income households do not have sufficient incomes to access rental housing at a cost they can afford.

Prepared by Steve Pomeroy, Focus Consulting in association with Greg Lampert and Kathleen Mancer. Ottawa: Canada Mortgage and Housing Corporation, 1998, c1999. (Housing Affordability and Finance Series Research Report) 100 pages

Order number: PE0337

NOTE : Aussi disponible en français sous le titre : *Politiques et programmes relatifs au secteur locatif privé : étude sur l'expérience internationale*

STATUS : New Completed Report

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REGULATORY FACTORS IN THE RETENTION AND EXPANSION OF ROOMING HOUSE STOCK

This project will analyze the role of regulatory factors in the retention and expansion of rooming house stock. This will involve compilation of rooming house regulations (provincial and municipal) in Canadian municipalities, identifying trends in the number and type of rooming houses, and an assessment of the degree to which regulation has influenced the trends. The analysis will include a comparison of regulatory environments, gains and losses in the rooming house stock, the function of the rooming house sector within the larger rental housing market, an analysis of demographic factors affecting the need and demand for rooming houses, and an analysis of the relationship between the intent and the effect of regulations concerning rooming houses.

CMHC Project Officer : *Anna Lenk*

CIDN : 2289 0200

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

NEW

UNDERSTANDING PRIVATE RENTAL HOUSING INVESTMENT IN CANADA

The key study objectives were:

- To examine the nature and extent of private rental housing investment in Canada;
- To develop a profile of who is investing in private rental housing; and
- To establish a thorough understanding of what investors and lenders consider in their decision-making process.

The ultimate goal of the research was to provide a solid basis from which public and private sector decision-makers can act in an informed manner.

Rental housing can be divided into two broad sectors:

- Private rental housing refers to units owned by private sector investors; the owner or occupants may have received a government subsidy/incentive at some point, but the units themselves remain in the hands of the private sector.
- Social/assisted rental housing includes any publicly owned rental building, including non-profit and co-op buildings.

It is private rental housing which forms the focus of the current study.

Investment in private rental housing can take a variety of forms, including:

- Developing new "purpose-built" rental properties for own portfolio or for sale to other investors;
- Purchasing rental properties from a previous investor (or developer);
- Holding/owning existing rental properties on an on-going, longer-term basis;
- Converting purpose-built owner-occupied or non-residential space to rental tenure - either temporarily or permanently; and
- Upgrading existing rental properties (i.e. renovation/repair work).

RENTAL HOUSING

This report covers each of these various types of private rental investment to some degree. However, the emphasis of the analysis, particularly with respect to the development of a profile of rental investors, is on what are termed "active" investors - those who invest in new units, or are purchasing existing units.

The study takes a Canada-wide view of private rental investment. Where available, statistical information is presented for the 26 Census Metropolitan Areas (CMAs). In addition, the following 6 major markets have been selected for more in-depth analysis in some instances: Halifax; Montreal; Toronto; Winnipeg; Calgary; Vancouver. These centres were chosen as they are among the largest rental markets, and also provide for a degree of geographic variation.

Prepared by Clayton Research Associates Limited and Fish Marks Jenkins Real Estate Consulting. Ottawa: Canada Mortgage and Housing Corporation, c1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0335

NOTE : Aussi disponible en français sous le titre : *Comprendre les activités d'investissement dans le logement locatif privé au Canada*

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** SEE ALSO: *Rental Stock Envelope Survey*, p. 40
Impact of Conversions of Rental to Ownership Units on Housing Markets in Ontario, p. 203

RESIDENTIAL DEVELOPMENT

COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

The study will address how Land Use Density (LUD) stipulations can impact and/or interplay with the various other system components of community plan-making,, e.g. open space, schools, retail, etc.

CMHC Project Officer : *Doug Pollard*

CIDN : 1998 0200001

Division : External Research Program
Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

DENSIFICATION RÉSIDENTIELLE EN QUARTIER CENTRAL : LE CAS DU MILE-END À MONTRÉAL

Residential intensification is a subject of great interest, as there is a will to slow down urban sprawl, to revitalize central city districts and to optimize the use of existing infrastructure. This research project examines the intensification phenomenon that has recently occurred in the Mile-End district near downtown Montréal where close to 1,000 new dwellings have been added to the existing housing stock over five years. Fifty cases of new construction, existing building recycling and demolition-reconstruction projects were enumerated within an area covering just 226 hectares. A survey among the residents of the new dwellings provided more information about these central district clients and their motivations, as well as the features of the new dwellings. Are the residents new in the sector? Are the new dwellings affordable and for whom? What factors encourage or, on the contrary, discourage residential intensification? This research project attempts to provide answers that could be useful to Canadian municipalities contending with declining sectors and wishing to develop effective revitalization policies.

Prepared by Jocelyn Duff and Terrence Dawe. CMHC Project Officer: Mark Holzman. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

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ECONOMIC IMPACTS OF ANCILLARY HOUSING EXPENDITURES (VOLUME 1: SUMMARY REPORT; VOLUME 2: TECHNICAL REPORT)

This study develops up-to-date estimates of the economic impacts of a variety of housing-related ancillary expenditures. It is intended to complement an earlier series of studies commissioned by CMHC in 1997/1998 that estimated the economic impacts of basic housing construction and renovation. In the present case, economic impacts are obtained for ancillary expenditures (rather than direct construction) from three related types of housing expenditure: initial construction preparation (hereafter, 'new construction'), the sales of newly-constructed dwelling units held in stock, and the sales of existing dwellings. A variety of ancillary expenditures are considered, including, where possible, infrastructure and land development, selling costs, professional fees and financing. The contractor provides estimates of direct, indirect and induced impacts on aggregate and sectoral employment and GDP from ancillary expenditures associated with residential construction expenditures, sales of newly-constructed dwellings and sales of existing dwellings.

Prepared by Peter Dungan and Peter Norman. CMHC Project Officer: David Metzak. Ottawa: Canada Mortgage and Housing Corporation, 2000. 2 volumes

STATUS : New Completed Report

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EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM: AN ECONOMETRIC ANALYSIS

This report examines the connections between increasing development charges placed on residential construction and the spread and density of cities. It first reviews the literature on the extent to which increases in development charges increase housing prices and on the estimated coefficients describing the price elasticity of demand for housing.

The empirical work develops multivariate logit models of tenure and building type choice by examining the differences across Canadian cities attributable to differences in the price of housing services relative to consumers' income.

The study concludes that increasing development charges favours the growth of demand for higher-density building types, primarily by keeping a relatively large proportion of households out of the homeownership market. Both homeowners and renters are shown to react to higher price levels by increasing their propensity to move into a row or townhouse rather than a single-family detached house, or to move into an apartment rather than a townhouse. Young people are affected more than older people by increases in development charges.

The report will benefit planners, municipal finance officers and elected officials interested in market-based tools and techniques to influence urban growth and development.

Prepared by Andrejs Skaburskis. CMHC Project Officer: David D'Amour. Ottawa: Canada Mortgage and Housing Corporation, c1999. (Healthy Housing and Communities Series)

Order number: PE0351

NOTE : Aussi disponible en français sous le titre : L'effet des droits d'aménagement sur la forme urbaine.

STATUS : Completed Report

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GROW-AS-YOU-GO: A PROGRESSIVE APPROACH TO HOUSING DEVELOPMENT

This External Research Program study will elaborate and validate a conceptual approach to progressive, or incremental, housing development, in order to enable the implementation of a concrete demonstration project. The project will summarize the experience of precedents of incremental housing solutions; do an assessment of the number of low income households that could benefit from this approach; determine what regulations would enable its implementation; apply the concept to sites identified by the City of Toronto for development.

CMHC Project Officer : *Fanis Grammenos*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2144 0200013

STATUS : Ongoing Project

IMPACT OF SECONDARY SUITES ON MUNICIPAL INFRASTRUCTURE AND SERVICES

The purpose of this research was to investigate and summarize different approaches for determining the municipal servicing costs, both capital and operating, of secondary suites in established neighbourhoods and new subdivisions, through a literature review, resident surveys and key municipal government informant interviews.

Municipalities are increasingly relying on user fees as a way to generate revenue. In BC, there is a growing trend to apply this approach to secondary suites, and municipalities are introducing utility fees and other charges for municipal services for both legal and illegal suites. This is in response to a perception that suites place an additional burden on municipal infrastructure. The rationale provided for these fees is to provide revenue to address the impact of secondary suites on municipal infrastructure and services, and to address community concerns that suites should pay their "fair share" of municipal taxes and costs. However, there is concern about how charges are being calculated and whether they are being assessed equitably. There are also claims that the charges are motivated by municipalities' need to seek additional revenues other than property tax.

This report examines the impact of secondary suites on municipal infrastructure and services. It also assesses the validity of different approaches regarding charges for secondary suites based on a literature review and case studies of three municipalities.

The literature review found no empirical evidence of actual impacts of secondary suites that would justify charging fees. The most commonly held view is that accessory apartments should not place an increased burden on services because they are most likely to occur in areas that have experienced a decline in population and reduced household sizes.

The case studies showed that the impact of secondary suites is likely to vary considerably based on the type of municipality. In urban core municipalities, a minimal impact is likely. Newly developing greenfield outer suburbs may face the greatest impact. In inner suburbs, the impact is unknown. Survey results demonstrated that homes with suites do not consume twice the mount of municipal services as those without. For virtually all aspects of urban infrastructure examined: water and sewer, garbage and recycling, and parking - the occupants of homes with secondary suites consumed less than double the services. Therefore, if municipalities wish to charge for these services on a per unit basis, according to this study, it would appear that the rate for secondary suites should be less than the charge for single family homes.

The authors found that municipalities first need to determine if they wish to charge for suites. The authors recommend that municipalities consider affordable housing policy objectives, administrative issues, and demographic trends in their area. If they wish to charge, they should consider charging based on consumption or based on the type of municipality. The study found the impact of secondary suites on municipal infrastructure to vary in urban core and outer suburban municipalities.

Prepared by Vanessa Geary, Tenant's Right Coalition, Margaret Eberle, and Deborah Kraus. CMHC Project Officer: Steve Mennill. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

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INFORMATION REVOLUTION AND RESIDENTIAL DEVELOPMENT: SUMMARY REPORT

The purpose of this report is to provide a broad overview of the implications of the information revolution for residential development. It identifies the key drivers of change related to the information revolution that impact residential development and describes the state-of-the-art in information and communications technologies in community planning.

Prepared by Pamela Blais, Metropole Consultants. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

NOTE : Aussi disponible en français sous le titre : *La Révolution de l'information et l'aménagement résidentiel*

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INNOVATION IN PRACTICE: KEYS TO ALTERNATIVE DEVELOPMENT STANDARDS

This study aimed to find ways to accelerate innovation in residential land use. Due to the widening gap between subdivision standards and demographically-driven housing needs, the obstacles to challenging established rules and regulations (fighting city hall), and the fact that few initiatives have made significant headway into modifying standards, this research sought keys to how innovative standards get introduced. The primary objective was to isolate critical factors enabling alternative development standards (ADS) according to developers who have succeeded in introducing ADS, as well as municipal officials involved in these projects. As a secondary objective, interviewees were asked for ideas on how to address complex regional scale (off-site) standards, such as those affecting stormwater, arterial road, school and park infrastructure.

Interviews produced practical advice and strategies on how to successfully alter standards, which should assist future ADS proposals. Even more important, close inspection of this information revealed keys to successful initiatives, namely that proponents instinctively nurtured four critical conditions: (1) clear rationale for and presentation of proposals, (2) municipal receptivity, (3) ability to support an extended approval process, and (4) readiness of the housing market for alternative housing and community forms. Notably, proponents cultivated these key conditions rather than regard their absence as barriers to innovation.

Concrete suggestions for how to change off-site standards were elusive; however a clear picture of deterrents to evolution of these standards emerged. Major deterrents include adherence to "Cadillac" standards, lack of leadership, and most importantly, lack of information and communication, especially the availability of concise and relevant information and effective information exchange. Better information alone, particularly concerning who really pays for the full costs of expensive off-site infrastructure, would be productive.

Developers, municipalities and higher-order levels of government each can uniquely contribute to the move towards more affordable, community-minded, and environmentally sustainable land use standards. Recommendations are provided for each group that can, if implemented, accelerate the adoption of innovative standards so that they can better keep pace with changing housing needs.

Prepared by Teresa Paul, Habitat Associates with the assistance of Chris Hartman, Bryan Kozman and Andy Manahan. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

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INTENSIFICATION IN URBAN AREAS

This report examines the issue of urban intensification in order to deal with population growth pressures and sprawl. Intensification (also referred to as revitalization or re-urbanization) is a counter-sprawl concept intended to slow the trend toward rampant development of greenfield sites on the urban fringe. Recent studies have found that an intensified development form could result in at least 25% reduction in infrastructure costs and a 40% savings in land consumption. Canadian cities need to encourage mixed-use intensification -- including both new jobs and new housing -- in order to assure efficient public transit, to accommodate changing populations, and to ensure sufficient jobs and population to maintain vibrant urban centres.

Computer visualization is employed in this study to project (in "picture" form) the size, shape, location and appearance of proposed developments and their associated density implications. This technology, which combines geographic information systems and computer-aided design software, is used to illustrate the impacts of intensification on neighbourhoods and the potential visual effects of projects that have not yet been built.

This report demonstrates that:

- Residential and mixed-use intensification is already occurring in some Canadian cities;
- Infill and intensification may be (and have been) effectively employed to increase the stock of affordable housing and to revitalize urban centres; and
- Governments and housing providers must re-think the basis for regulatory controls, rigid building and zoning codes, as well as planning mechanisms which impede the production of low-cost housing;
- Intensification has been achieved by a variety of measures; these include design guidelines in lieu of outdated zoning controls, as-of-right zoning to reduce time delays and processing costs, live/work spaces to promote the provision of both residences and jobs in the city, and the use of density bonuses to encourage concentrated development in key locations (such as transit nodes on major arterials) where revitalization is desirable.

Prepared by Gerald Daly, Richard Milgrom. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

STATUS : Completed Report
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INTERNATIONAL EXPERIENCES WITH PERFORMANCE-BASED PLANNING

This study examined international approaches to planning and development regulation through the use of performance based planning. These approaches provide useful lessons and insights in improving the flexibility and effectiveness of the development environment in Canada. In addition to summarizing existing literature on the topic, the research includes the results of interviews with government, development and academic informants in Australia, New Zealand, the United States and Europe.

Prepared by Hok-Lin Leung and Kevin A. Harper for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, c2000. (Housing Affordability and Finance Series; Research Report)

Order number: PE0378

NOTE : Aussi disponible en français sous le titre : *La planification fondée sur le rendement : étude de cas à l'étranger*

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LEARNING FROM SUBURBIA: RESIDENTIAL STREET PATTERN DESIGN

This investigation of suburban street patterns was prompted by the current debate on the state of suburban development, including its forms and the impact of street patterns on the quality of life in suburbs.

Street patterns contribute significantly to the quality and character of a community. When placed in their proper historic context, street patterns become meaningful by revealing their functions, and may then help address contemporary planning issues. the study identifies some of these issues, examines the evolution of suburban street patterns and, by synthesizing those attributes of street patterns that best respond to the contemporary suburban context, suggests the following design strategies:

- rationalize conventional suburban street patterns while maintaining their essential characteristics;
- restructure the private and public realms based on the current technological, economic and social context;
- establish a structured framework of stable and alterable design elements to accommodate physical change; and
- establish regular but diverse cells to manage growth.

Prepared by Julie Tasker-Brown and Sevag Pogharian. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

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ROOFTOP GARDENS

GREENBACKS FROM GREEN ROOFS: FORGING A NEW INDUSTRY IN CANADA

The purpose of this study is to review the benefits of green roofs and vertical gardens, examine barriers to diffusion of technologies in Canada and recommend ways to overcome those barriers.

Green roof and vertical garden technologies offer an outstanding number of public and private benefits including: energy cost savings from increased insulation; increased property values; savings on stormwater infrastructure; air quality improvements; and enhanced aesthetic, health and recreational opportunities.

Barriers to the diffusion of these technologies include: lack of knowledge and awareness; lack of incentives; cost barriers; technical issues; and risks associated with uncertainty. These barriers can be overcome by: compiling a repository of knowledge on the Internet; high profile demonstration projects; government procurement support; government policy and program support; financial incentives such as insurance premium reductions and performance based contracting; and research to address information gaps.

Prepared by Steven W. Peck, Chris Callaghan, Brad Bass, and Monica E. Kuhn. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

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ADJUSTMENT OF THE ELDERLY TO CONGREGATE CARE HOUSING

This study proposed and tested a model to predict which elderly persons will adjust well to which forms of congregate care housing. Congregate care is defined as multi-unit residential housing for seniors who are physically and mentally healthy, but require some non-medical support services. The study's specific goal was to discover some (a) aspects of congregate care housing that promote positive adjustment for virtually all residents, (b) resident characteristics associated with satisfaction regardless of building, and (c) salubrious combinations of building and resident characteristics associated with positive resident adjustment. The ultimate practical goal, for which this study was a first step, was to develop an assessment device that will predict which persons will better adjust to which forms of congregate care housing.

Prepared by Robert Gifford for Optimal Environments, Inc. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

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AGING TENANTS IN THE PRIVATE RENTAL MARKET

This report presents the results of a case study analysis undertaken in Vancouver, Victoria, and Winnipeg of privately owned and operated rental buildings occupied by a significant concentration of aging tenants. The focus of the research project was four-fold:

- to conduct a review of the literature focused on aging tenants in the private rental market;
- to assess, via a series of case studies, the willingness and the capability of private landlords in Vancouver, Victoria, and Winnipeg to respond to the needs of their aging tenants;
- to identify and describe initiatives that have been undertaken in the private and public rental sectors across Canada to accommodate the needs of aging tenants; and
- to describe measures that may help landlords address the needs of aging tenants.

Prepared by Kathleen Mancer in association with Donna Kosmuk and Roger Langlois. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

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HOUSING FOR OLDER CANADIANS: THE DEFINITIVE GUIDE TO THE OVER-55 MARKET

Canada's older market - 55 and older - is healthier, more active, more informed, more affluent and more demanding than ever before. "Housing for Older Canadians" is the definitive guide for individuals and organizations who want to design, develop, market, manage and sponsor housing for the "over-55" market. Parts of this book will also be useful for support-service providers and for organizations representing older people and who want to help their members find appropriate housing solutions. The guide is tailored to Canadians, and draws on experiences from Canada and other countries, such as the United States.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2184 **Price: $49.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Le logement des aînés au Canada.*

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HOUSING OPTIONS FOR PEOPLE WITH DEMENTIA

One disease that can affect older people is dementia. This is a term used for a group of symptoms that affect mental abilities, including: the ability to remember, reason, make decisions, judge and communicate. There are various forms of dementia: the effects of some can be reversed; those of others, currently, cannot. For those people with a progressive type of dementia, specialized care in specialized environments is required to enhance their abilities and quality of life.

This guide sets out to increase public awareness of new housing options for people with dementia and to encourage the development of more community-based solutions. More specifically:

- it describes a range of housing options designed to meet the particular needs of people with dementia;
- it outlines a range of support services that can help caregivers to fulfil their responsibilities;
- it discusses a number of housing management principles that can help in the care of people with dementia; and
- it discusses environmental design considerations for housing people with dementia.

One of the important concepts presented in this guide is that of "residentiality". Very simply, this concerns the importance of creating a home-like setting for those suffering from dementia. The guide discusses two primary options for those suffering from dementia - to remain at home (whether that is a detached suburban bungalow, a condominium apartment or a dwelling unit in a retirement community), or to move into housing specifically designed for people with dementia. For those who can no longer remain at home, the guide presents a number of housing options where persons with dementia can maintain a comfortable sense of living normally.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2214 **Price: $24.95 + GST and handling charges.

NOTE : Aussi disponible en français sous le titre : *Les choix de logements pour les personnes atteintes de démence*

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IMPORTANCE DU RISQUE ENVIRONNEMENTAL DOMICILIAIRE DANS LA SURVENUE DES CHUTES CHEZ LES PERSONNES ÂGÉES

Research done in recent years has shown that falls by the elderly are not due to chance and are attributable to a combination of factors pertaining to their physical and psychological state, their behaviour and their physical environment. Contrary to intrinsic factors, the environmental component in the risk of falls, though frequently cited as a contributing cause, has been investigated far less. According to studies published in the past twenty years, it has been estimated that the physical environment accounts for close to one half of the falls which occur in the home. The establishment of an environmental risk level pertaining to elders represents a crucial point in preventing falls. In this study, four objectives were pursued:

- List in order the environmental risk factors which relate to falls based on the opinions of a group of experts;
- Determine the level of environmental risk encountered on a daily basis by the elderly living in their homes;
- Identify high-risk sectors in homes;
- Estimate the correlation between the level of environmental risk and the occurrence of falls.

This study examined residents in the Quebec urban region 65 and over, who are autonomous, active and living in their homes. To ensure a homogeneous sample, participants in the study did not require help to move about (walkers and wheelchairs). Two hundred and eleven appointments were scheduled and 192 visits were made between July 21 and October 6, 1997. The information was essentially collected from two measuring instruments completed by interviewers when they visited, i.e., a checklist of environmental risk elements and a questionnaire dealing with the respondent's characteristics (sociodemographic data, whether they have fallen and their history of falling, the level of activity in the home).

Using a linear measuring scale, a group of experts listed in order the various environmental risk factors. This group consisted of 24 persons and covered three specific areas of interest - health, architecture and retired persons. The respondent had to rate each risk factor by choosing a figure on a linear scale to indicate the importance of the factor.

Prepared by Benoît Lévesque, Isabelle Lamontagne, Pierre Maurice, René Verreault, Suzanne Gingras and Denis Gauvin. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation 1999. (External Research Program)

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MEETING SENIORS' HOUSING NEEDS: A GUIDE FOR COMMUNITY GROUPS

The purpose of this guide is to help seniors' organizations throughout Canada understand how they can influence the provision of seniors' housing in their communities. This guide is intended to help organizations of all types and backgrounds, from the brand new to the old hands. Its contents are based, in part, on input received from seniors' organizations all across the country, including some which have developed dozens of housing projects, some working on their first, and some making their contribution in other ways.

The guide is divided into three parts.

Part 1 - An Overview of Seniors' Housing describes seniors' housing preferences and options, as well as an overview of the way seniors' housing is developed and managed in Canada.
Part 2 - A Framework for Action will help a group get organized, provides some advice on understanding housing needs in a community and gives a few suggestions about how community groups can raise funds to help finance their activities.
Part 3 - Ideas for Action reviews three broad approaches to meeting seniors' housing needs that could be used by community groups throughout Canada.

The guide also contains an annotated bibliography and a list of useful contacts that will help organizations quickly find more information.

Prepared by Kathleen Mancer and Donna Kasmuk, DKM Housing Consultants, with research assistance provided by Anglais et associés. CMHC Project Manager: Steven Mennill. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Distinct Housing Needs Series; Research Report) 43 pages

Order number: PE0350

NOTE: Aussi disponible en français sous le titre : *Répondre aux besoins en logement des personnes âgées : Guide pour les groupes communautaires*, PF0350

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SAFETY IN CASES OF FIRE - PERSONS WITH REDUCED MOBILITY LIVING IN REGULAR RESIDENTIAL ENVIRONMENTS

This study is aimed at integrating current knowledge and reflections concerning the problems associated with the safety of seniors and persons with disabilities living in regular residential environments, in order to apply them to the development of intervention models for three multiple-family buildings equipped with elevators.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1460 0200001
STATUS : Ongoing Project

STUDY OF SPATIAL ORIENTATION IN A RESIDENTIAL COMPLEX FOR SENIORS WITH OR WITHOUT COGNITIVE DISORDERS

The general purpose of this research project is to obtain spatial orientation design criteria that will make it possible to work on the architectural environment of residential complexes for seniors. The analysis concerns three typical residential complexes.

CMHC Project Officer *: Luis Rodriguez*

CIDN : 2144 0200017

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

SUPPORTIVE HOUSING FOR SENIORS

Supportive Housing for Seniors describes the concept of supportive housing, discusses how it works, who can benefit from it, what types of supportive housing options can be made available and how these can be developed. It contains over 100 photographs, floor plans and charts, and features ten examples of supportive housing projects from across Canada. It also contains a list of additional examples of supportive housing, and a set of extensive end notes which draw on the most recent and relevant sources in Canada and the US.

As more and more Canadians live longer and healthier lives, a large and growing market for housing geared specifically to older seniors (75+) is emerging. Supportive Housing for Seniors is designed to help the housing and support service industries develop an appropriate range of housing options for this unique segment of the population.

Prepared by Social Data Research Ltd. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Distinct Housing Needs Series Research Report) 49 pages

Order Number: PE0381

NOTE : Aussi disponible en français sous le titre : Le logement-services pour les aînés

STATUS : New Completed Report

AVAILABILITY :CMHC Information Products
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USER SATISFACTION STUDY OF HOUSING OPTIONS FOR OLDER CANADIANS

The objective of this research is to carry out user satisfaction studies of some of the newer housing options that are currently available to older Canadians, and to produce an objective and detailed report based on the results of the research.

CMHC Project Officer : *Luis Rodriguez*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1583 0200001
STATUS : Ongoing Project

VIVRE À DOMICILE OU EN RÉSIDENCES PRIVÉES : UN DÉFI POUR LES AÎNÉS ET LES INTERVENANTS

In recent decades, Quebec, like Canada, has been confronted with a new and preoccupying reality: the rapid aging of its population. Current governments are opting for a reduction in institutional accommodation for seniors, in line with their rationalization objective. They are consequently gearing their policies and programs to greater responsibility on the part of the community and private retirement housing sectors. This deinstitutionalization represents, in many respects, a sizable challenge for managers and workers in the retirement housing sector, both regionally and nationally.

In fact, the expansion of the private retirement housing and home care sectors and the situation of the workers in these sectors are exposed to many risks. Among other things, the tendency towards heavier workloads caused aging clients, inadequate working conditions, insufficient internal and external resources, profitability and competitiveness objectives and lack of training and support are factors that could greatly affect the day-to-day work of the staff and the operations of the organizations. In addition, these threats could compromise the safety and protection of older clients, and promote the negligence and exploitation of these clients.

This research project studies the restrictions and difficulties encountered by staff working in the private retirement housing sector within the Saguenay area and in community home care organizations, and then takes into consideration the viewpoint of seniors who use these types of resources.

The results obtained allow for an identification of the barriers and limits faced by managers and staff working with independent and semi-independent seniors. The training needs of these workers from the perspective of meeting all the needs and expectations of the seniors whom they deal with are also covered by this research.

Principal Investigators: Danielle Maltais and Suzie Robichaud. Research Assistants: Anne Simard, Martin Truchon, Alain Girard. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, Ontario, K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069, Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

EVALUATION OF THE URBAN SOCIAL HOUSING PROGRAMS

The Evaluation of the Urban Social Housing Programs by Canada Mortgage and Housing Corporation (CMHC) covers the Non-profit, Rent Supplement and Urban Native Housing Programs delivered since 1973. These programs were the main elements of the urban social housing strategy introduced by the Federal Government in 1985. The evaluation focused on the programs delivered between 1986 and 1993, but also covered other versions delivered prior to 1986. While new commitments under these programs were terminated in 1993, subsidies continue to be provided to the portfolio of existing projects. Note that the Residential Rehabilitation Assistance Program (RRAP), co-operative housing projects and special purpose housing projects were part of the 1986 urban social housing strategy, but were not included in this evaluation. The Public Housing and Limited Dividend Housing Programs were also not included in this evaluation, nor were any unilateral provincial housing programs.

The evaluation report provide descriptions of the programs and evaluates the success of the following:

- client targeting;
- impacts on housing situation, quality of life, social and economic well being;
- current housing situation and client satisfaction; and
- management effectiveness.

Finally, the report comments on the Non-profit and Urban Native Project costs and examines the cost effectiveness of the Non-Profit Program relative to the Rent Supplement Program.

Prepared by: Audit and Evaluation Services, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999.

NOTE : Aussi disponible en français sous le titre : *Évaluation des programmes de logement social en milieu urbain*

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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CMHC CONTRIBUTION TO THE SUSTAINABLE COMMUNITY DEMONSTRATION IN SURREY B.C.

This study will document the planning of an innovative, sustainable community in an emerging urban area of Surrey, B.C. It will result in model by-laws and regulatory changes, a best practice guide and quantification of environmental benefits of this alternative neighbourhood compared to a conventional one.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available
CIDN : 2219 0200001
STATUS : Ongoing Project

LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES

The purpose is to develop an updated advisory document on landscape design, construction and maintenance for Canadian homes. CMHC's last advisory document of this nature, entitled Landscape Architectural Design and Maintenance, was published in 1982. While it offers many practical tips and tools which should be emulated, the update will be more oriented toward a consumer-audience, place more emphasis on sustainability and build on recent CMHC research in this area. The document will be published in 2001 and will be of interest to consumers, landscape architects and the landscape industry.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available
CIDN : 2229 0200001
STATUS : Ongoing Project
NEW

MEASURING STICK: SOCIAL SUSTAINABILITY IN MULTI-UNIT HOUSING

This External Research Project will develop indicators that will measure the quality of life as it is affected by features of housing in three different multi-unit urban neighborhoods. These indicators will be then used to design and test a survey instrument aimed at capturing the social and physical attributes of housing as they pertain to sustainable urban communities.

CMHC Project Officer : *David Metzak*
Division : Research Division
AVAILABILITY : Publication is not available
CIDN : 2144 0200003
STATUS : Ongoing Project

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

MULTIPLE HOUSING FOR COMMUNITY SUSTAINABILITY

This project produced information to assist developers and municipalities in developing land at higher than current average densities by means of multiple housing forms. It assembled and developed exemplary multiple housing solutions and assessed consumer demand for these. It also identified market segments and strategies to attract them to medium density housing. The report provides advice on the likely clients for medium density, multiple housing and on project design attributes that will entice them to choose medium density (townhouses and walk up apartments) over single detached housing.

CMHC Project Officer : *Fanis Grammenos*
CIDN : 1628 0300001
Division : Research Division
STATUS : Completed
AVAILABILITY : Publication is not available

YOUR NEXT MOVE: A GUIDE TO SUSTAINABLE COMMUNITY PLANNING

This guide will be aimed at both homeowners and renters planning to move. It will provide a checklist of features that they can look for to identify communities that are affordable, livable, accessible and environmentally sustainable.

CMHC Project Officer : *Susan Fisher*
CIDN : 2158 0200002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

** SEE ALSO: *Sustainable Development in Canada*, p. 197

URBAN TRANSPORTATION

DESIGN GUIDELINES FOR REGIONAL ROAD CORRIDORS

The purpose of the study is to develop new guidelines to encourage regional road corridors that are safe and easy to access for pedestrians and that are pleasant places for neighborhood interaction. These corridors should function as public spaces that link communities and enhance living conditions for households within those communities. A research highlight is expected in the fall, 2000.

CMHC Project Officer : *Susan Fisher*
CIDN : 2203 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL: TOOL FOR EVALUATING NEIGHBOURHOOD SUSTAINABILITY

The purpose of this study is to compare the greenhouse gas (GHG) emissions from personal urban transportation given variations in community planning and design variables such as density and land use mix. The final product will be a software tool that would be used by CMHC and its clients to evaluate development proposals for GHG emissions from urban travel. In the study, the software is used to compare the GHGs from urban travel of nine neighbourhood scenarios, each with different design features and locations.

CMHC Project Officer *: Susan Fisher*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2041 0200001

STATUS : Ongoing Project

IMPACT OF URBAN FORM AND TRAVEL ACCESSIBILITY ON PRIVATE VEHICLE USE: SUMMARY

The purpose of this study is to measure the influence of land use patterns and urban form on household travel demand and behaviour. Using household travel survey data from the City of Edmonton, multiple regression analyses were conducted to examine the influence of factors such as: household income and size; accessibility measures by walk, cycle, transit and auto; density and road patterns.

While this study shows that automobile use is largely influenced by factors beyond the 'reach' of planners and engineers, it also indicates that measures that improve walk, transit and bike accessibility and that reduce auto-accessibility can result in substantial reductions in household automobile use. The influence is greatest when these measures are applied in combination.

Prepared by Hunt Analytics Incorporated. Prepared for Research Division, Canada Mortgage and Housing Corporation; Health Canada; Environment Canada. CMHC Project Manager: Susan Fisher. Ottawa: CMHC, 1999. (Healthy Housing and Community Series; Research Report)

Order number: PE0342

NOTE : Aussi disponible en français sous le titre : Incidence de l'aménagement urbain et de l'accessibilité du transport sur l'utilisation de la voiture particulière.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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CANADIAN WOMEN AND THEIR HOUSING: 1997

The specific objective of this research study is to provide a profile and analysis of women, health and well-being related to housing issues in the 1990s. This report, building on and updating a 1983 report Women as Housing Consumers, is intended to provide information for use by academics, students, researchers, planners and housing policy-makers at municipal, provincial, and federal levels, and women generally. The study is also intended to suggest future directions for research, policy and dialogue with regards to healthy housing for women.

Prepared by: SPR Associates Inc. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.(Housing Choices Series.)

Order Number PEO313

NOTE : Aussi disponible en français sous le titre : *Les canadiennes et leur logement : 1997.*

STATUS : Completed Report
AVAILABILITY : CMHC Information Products
700 Montreal Road
Suite 1000
Ottawa, Ontario
K1A 0P7
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Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

ENHANCING TRANSITION SHELTERS THROUGH RENOVATION: CASE STUDIES

The purpose of this research study was to explore issues facing transition shelters serving women and children from domestic violence situations when renovations to shelters are undertaken. Specifically, the research examined the effects of repairs and improvements to shelters funded through CMHC's Shelter Enhancement Program (SEP) through case studies of five shelters in the Lower Mainland and Vancouver Island of British Columbia.

The research included a focus group of women who use the shelters, key informant interviews with shelter staff, municipal officials and contractors, and site visits to the shelters. Case study summaries for each of the five shelters are included in the final report along with a discussion of the general themes and challenges associated with the renovation process.

The key findings are discussed related to six broad topics:

1. Safety and security 2. Accessibility 3. Client privacy and social needs 4. Renovation processes 5. Challenges in building renovation 6. Funding mechanisms

The research study found that there are definite benefits to the shelters from the repairs and improvements including improved client services and improved housing conditions. In addition, the SEP serves as an important funding source which also contributes to the local economy. At the same time, shelters face challenges in carrying out renovation work. Shelter staff are often not 'experts' in building repairs and renovation, and the timing of the renovations may be challenging when the shelters must still continue to provide services to their clients. As well, the funding amounts available pose limitations on the work that can be undertaken. For example, shelter staff would like to improve the accessibility of their buildings for people with disabilities, but the types of renovations required would be very expensive. Finally, the report offers some suggestions for improvements in the funding approach that could be considered.

Prepared by: Cheryl Hall. CMHC Project Officer: Pat Streich. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
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Tel.: 613-748-2367 or 1-800-668-2642
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** SEE ALSO: Women on the Rough Edge, p. 159

HOUSING CANADA'S YOUTH

This research report reviews the main economic and sociocultural factors which encourage, facilitate or precipitate young people's departure from the parental home and some of the implications of these decisions. It discusses the questions of affordability, housing tenure, and satisfaction and aspirations of young people with regards to their housing. The problem of youth homelessness is discussed, including risk factors, housing-related strategies aimed at prevention, response to crisis situations, and possible resolutions.

This research report provides stakeholders with a picture of how Canadians under 30 years old are housed and an understanding of the major housing issues and options faced by Canada's youth.

Prepared by Damaris Rose, Jaël Mongeau, and Nathalie Chicoine. Ottawa: Canada Mortgage and Housing Corporation, 2000. (Distinct Housing Needs Series; Research Report) 68 pages

Order Number: PE0310

Note: Aussi disponible en français sous le titre : *Le logement des jeunes au Canada*

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products
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INNOVATIVE HOUSING FOR HOMELESS YOUTH

The purpose of this project is to research and identify the innovative aspects of housing for homeless youth in terms of architecture, management and support services and to identify what makes a project exceptional and successful.

CMHC Project Officer : *Gloria Neufeld Redekop*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2305 0200001
STATUS : Ongoing Project
NEW

** SEE ALSO: *Study on the Residential Integration of Immigrant Youth in Montreal, p. 176*
Environmental Scan: Youth Homelessness, p. 156
Services for Children and Youth in Canadian Shelters for Homeless Families, p. 158

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